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NORDA BENCH MARK PACKAGE DOCUMENT

Technical Task Report

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Prepared Under
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Prepared By:

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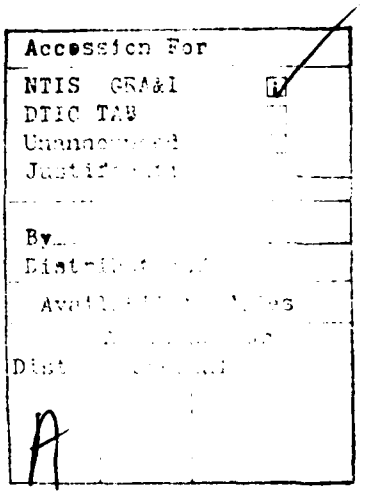
FOREWORD

This document is a task report prepared under Contract No. N00014-80-C-0409 for the Office of Naval Research, Washington, D.C. in support of the Naval Ocean Research and Development Activity (NORDA) Code 300, NSTL Station, Mississippi. The report presents user level instructions for executing each of five NORDA computer programs at a bench mark site using card decks and magnetic tapes that accompany this document.

Ocean Data Systems is indebted to Mr. J. Roberts, NORDA Code 301, for providing recommendations in selecting the programs to be included in this bench mark package and for his general assistance in this effort.



ABSTRACT

A suite of five NORDA computer programs has been selected to comprise the NORDA Bench Mark Package. The programs are coded entirely in CDC FORTRAN IV (except for one small assembly language function contained in the program AUTO-OCEAN). This document provides the user with information and instructions for executing each program at a bench mark site. Included with the Bench Mark Package are card decks and magnetic tapes, the contents of which are described herein. Sample inputs and outputs contained in this report were derived from these decks and tapes.

It is virtually impossible to foresee every problem that may be encountered in transferring a program between computers. This document places special emphasis on the FORTRAN/Operating System interfaces that are most likely to be site dependent and thus create problems. Information presented in the main text of this report should be sufficient to implement minor job stream and/or FORTRAN coding changes to the computer programs included in the Bench Mark Package in order to adapt them to the on-site operating system. Should more substantial changes become necessary, additional documentation and information are provided in the appendices.

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I. INTRODUCTION

This manual, with accompanying magnetic tapes and card decks, comprises the Bench Mark Package of the Naval Ocean Research and Development Activity (NORDA). The purpose of this package is to assist the user in executing each program on the bench mark computer. All programs were developed and currently execute on the CDC 6600/6700 system at the David Taylor Naval Ship Research and Development Center (DTNSRDC), Carderock, MD, under the following software:

Operating System:	NOS/BE 1.2
UPDATE:	Level 1.2-460
Compiler:	FTN 4.6 + 460 with optimization level 2 and ROUND = */
Loader:	Cyber loader 1.3-460.

The package consists of five programs, four of which execute in batch mode, and one which executes interactively. Four programs reside on tape; one is a FORTRAN punched card deck. Some of the programs are composed of several modules, each of which must be loaded and executed sequentially. Some of the modules are created by loading more than one binary file. Additionally some programs require data bases which must be transferred from tapes (provided with this package) to mass storage files prior to execution. Table I summarizes the programs and data bases. All tapes included in this package are unlabeled, 7-track, 800 bpi, Scope Internal tapes. Program tapes are in Program Library* (PL) random format, i.e., they were created as the NEWPL output from UPDATE, and thus can be attached as the OLDPL input to UPDATE on the bench mark computer. Each program library constitutes a binary record on tape. Data base tapes are written in various formats as appropriate. Table II summarizes the contents of all tapes included in the bench mark package.

Included for each batch mode program is an execution deck that has been run successfully on the CDC 6600/6700 system at DTNSRDC. For the interactive mode program, a card deck is provided to create and catalog the absolute (executable) object code. Each deck contains all the necessary commands to either execute or catalog a program, i.e., mount and access program and data tapes, create necessary data files on mass storage, call UPDATE, compile, load, execute or catalog the program, and purge data files that may have been cataloged. Additionally, all needed data cards are included. These decks will probably require modifications to the job streams before running at the bench mark site. Chapters II through VI present details of the decks and expected execution results.

To be consistent, each vendor should execute the four batch mode programs in the order in which they appear in Chapters II through V of this document, i.e., (1st) MPP, (2nd) AUTO-OCEAN, (3rd) NEWPE, and (4th) SYNACC. The interactive mode program, INTERACT, may be executed at any time.

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*Non-CDC vendors can be supplied with programs on cards and/or EBCDIC tapes.

TABLE I: SUMMARY OF PROGRAMS AND DATA BASES

Program Name	Execution Mode	Executable Module Name(s)	PL or Program Names	PL or Program Location	Data Base Name(s)	Data Base Location
MPP	Batch	MPP1	CFIELD	Tape CK0713, Binary Record 1.	None.	
			MPP1	Tape CK0713, Binary Record 2.		
		MPP2	MPP2	Tape CK0713, Binary Record 3.		
		MPP3	MPP3	Tape CK0713, Binary Record 4.		
		MPP4	MPP4	Tape CK0713, Binary Record 5.		
		MPP5	MPP5	Tape CK0713, Binary Record 6.		
AUTO-OCEAN	Batch	BSCRAM	BSCRAM	On cards in execution deck.	BATHY	Tape CK0654, Binary File 1.
		PSCRAM	PSCRAM	On cards in execution deck.	PROFILES	Tape CK0654, Binary File 2.
		AUTOOC	AUTOOC	Tape CK0713, Binary Record 7.		

TABLE I: SUMMARY OF PROGRAMS AND DATA BASES (continued)

Program Name	Execution Mode	Executable Module Name(s)	PL or Program Names	PL or Program Location	Data Base Name(s)	Data Base Location
NEWPE	Batch	INFACE	INFACE	Tape CK0713, Binary Record 8.	None.	
			AUTOCF	Tape CK0713, Binary Record 9.		
		NEWPE	NEWPE	Tape CK0713, Binary Record 10.		
SYNACC	Batch	SYNACC	SYNACC	On cards in execution deck.	FINALGRID 1111	Tape CK0456, Coded File 1.
					FINALGRID 1112	Tape CK0456, Coded File 2.
					FINALGRID 1121	Tape CK0456, Coded File 3.
					FINALGRID 1122	Tape CK0456, Coded File 4.
					FINALGRID 1131	Tape CK0456, Coded File 5.
					FINALGRID 1132	Tape CK0456, Coded File 6.
					FINALGRID 1141	Tape CK0456, Coded File 7.
INTERACT	Interactive	BMINTERACT	INRACT	Tape CK0713, Binary Record 12	None	

TABLE II: TAPE CONTENTS (continued)

Tape No.	Type	Used in Program(s)	Format	File or Record No.	Description
CK0713 (Duplicate backup is CK0720).	Program	MPP AUTO-OCEAN NEWPE INTERACT	Binary Records	1	Program Library CFIELD.
				2	Program Library MPP1.
				3	Program Library MPP2.
				4	Program Library MPP3.
				5	Program Library MPP4.
				6	Program Library MPP5.
				7	Program Library AUTOOC.
				8	Program Library INFACE.
				9	Program Library AUTOCF.
				10	Program Library NEWPE.
				11	Not used in bench mark package.
				12	Program Library INRACT.
CK0654 (Duplicate backup is CK0932).	Data	AUTO-OCEAN	Binary Files	1	The AUTO-OCEAN data base file BATHY.
				2	The AUTO-OCEAN data base file PROFILES.

TABLE II: TAPE CONTENTS (continued)

Tape No.	Type	Used in Program(s)	Format	File or Record No.	Description
CK0456 (Duplicate backup is CK0152).	Data	SYNACC	Coded Files	1	The SYNACC data base file FINALGRID 1111.
				2	The SYNACC data base file FINALGRID 1112.
				3	The SYNACC data base file FINALGRID 1121.
				4	The SYNACC data base file FINALGRID 1122.
				5	The SYNACC data base file FINALGRID 1131.
				6	The SYNACC data base file FINALGRID 1132.
				7	The SYNACC data base file FINALGRID 1141.

Each program contains certain subroutine calls that may be site dependent and thus will require special attention at the bench mark site. These calls involve mostly the handling of random access and direct access mass storage files, and FORTRAN/Operating System interface(s) for attaching cataloged files and connecting a terminal to a file. Table III lists possible site dependent subroutine calls, the program from which the calls are made, and the purpose of the call. More detailed documentation is contained in Chapters II through VI.

Chapters II through VI present detailed information for executing each of the five programs. Appendix A contains data regarding computer facility requirements that may be needed for the JOB cards at the bench mark site. Appendix B discusses a COMPASS coded function that exists in the PL for program AUTO-OCEAN. User level documentation for potential site dependent software is presented in Appendix C. Appendices D through H contain FORTRAN compilation listings of all program elements in each of the five programs that reference potentially site dependent routines.

TABLE III: POSSIBLE SITE DEPENDENT SUBROUTINE REFERENCES

Possible Site Dependent Subroutine	Location of Subroutine at DTNSRDC	Name of PL(s) or Program(s) Generating Call	Purpose of Call
CLOSEM	SL-SYSIO*	MPP2 MPP3	Close a direct access mass storage file.
CONNEC	SL-FORTRAN**	INRACT	Connect a file to a terminal.
DATE	SL-FORTRAN**	MPP5 NEWPE	Retrieve current date.
FILEDA	SL-SYSIO*	MPP2 MPP3 BSCRAM AUTOOC	Declare a file as a direct access mass storage file.
GET	SL-SYSIO*	MPP2 MPP3 AUTOOC	Read a record from a direct access mass storage file into core memory.
OPENM	SL-SYSIO*	MPP2 MPP3 BSCRAM AUTOOC	Open a direct access mass storage file.
OPENMS	SL-FORTRAN**	PSCRAM AUTOOC	Open a random access (word addressable) mass storage file.
PUT	SL-SYSIO*	MPP2 BSCRAM	Write a record from core memory onto a direct access mass storage file.

TABLE III: POSSIBLE SITE DEPENDENT SUBROUTINE REFERENCES (continued)

Possible Site Dependent Subroutine	Location of Subroutine at DTNSRDC	Name of PL(s) or Program(s) Generating Call	Purpose of Call
READMS	SL-FORTRAN**	AUTOOC	Read data from a random access (word addressable) mass storage file into core memory.
UNLOAD	NSRDC***	SYNACC	Unload a FORTRAN file.
WRITMS	SL-FORTRAN**	PSCRAM	Write data from core memory onto a random access (word addressable) mass storage file.
ZPFUNC	NSRDC***	SYNACC	Attach a cataloged data file from within a FORTRAN program.

* SL-SYSIO is a system library containing various I/O routines. It is included automatically by the loader at DTNSRDC.

** SL-FORTRAN is the standard FORTRAN system library. It is included automatically by the loader at DTNSRDC.

*** NSRDC is a library of miscellaneous utility routines at DTNSRDC. It must be explicitly included when loading.

II. MPP

II.1 General Information

MPP is a batch mode program composed of five separate modules (subprograms) which must be executed sequentially. Communication between modules is achieved using scratch mass storage files which are automatically allocated by the operating system. The execution deck references the modules (in order of execution) as MPP1, MPP2, MPP3, MPP4, and MPP5. The program is coded entirely in FORTRAN IV.

II.2 Location of Program

The components of MPP comprise PL numbers 1 through 6 (binary records 1 through 6), inclusive, on program tape CK0713 and backup program tape CK0720. The five executable modules require six PL's because MPP1 is created from PL's 1 and 2 (see Table I).

II.3 Job Stream

The job stream included in the MPP execution deck and listed in Section II.5 with comments performs the following basic functions: mounts program tape CK0713, updates from PL's on tape, compiles, loads, and executes each module. Job stream commands shown are those used on the DTNSRDC CDC 6600/6700 system. They may require modification at the bench mark site.

II.4 Input

MPP uses no external data bases. It is driven entirely by data cards. Each of the five executable modules has its own card input. MPP2 through MPP5 also read a scratch file written by the preceding modules. All necessary data cards are contained in the MPP execution deck and are listed in Section II.5.

II.5 Execution Deck

A listing of the MPP execution deck is presented in Figure 1 followed by comments. Numbers opposite card images in the figure coincide with the appropriate comment number. Job stream commands and data are identical to those which produced the output in Section II.6 on the CDC 6600/6700 system at DTNSRDC.

```
Comment                                                    Card
Number:                                                    Image:
   1 - VSN,OLDPL=CK0713.
   2 - REQUEST,OLDPL,HY,NORING.     /CK0713/NORING/
   3 - UPDATE,F,R,C=COMPILE.
   4 - REWIND,COMPILE.
   5 - FTN,I=COMPILE,L=0,OPT=2,R=CFIELD.
   6 - RETURN,COMPILE.
   7 - UPDATE,F,R,C=COMPILE.
   4 - REWIND,COMPILE.
   8 - FTN,I=COMPILE,L=0,OPT=2,B=MPP1.
   6 - RETURN,COMPILE.
   9 - LOAD,CFIELD.
  10 - MPP1.
   6 - RETURN,MPP1,CFIELD.
  11 - UPDATE,F,R,C=COMPILE.
   4 - REWIND,COMPILE.
  12 - FTN,I=COMPILE,L=0,OPT=2,B=MPP2.
   6 - RETURN,COMPILE.
  13 - MPP2.
   6 - RETURN,MPP2.
  14 - UPDATE,F,R,C=COMPILE.
   4 - REWIND,COMPILE.
  15 - FTN,I=COMPILE,L=0,OPT=2,B=MPP3.
   6 - RETURN,COMPILE.
  16 - MPP3.
   6 - RETURN,MPP3.
  17 - UPDATE,F,R,C=COMPILE.
   4 - REWIND,COMPILE.
  18 - FTN,I=COMPILE,L=0,OPT=2,B=MPP4.
   6 - RETURN,COMPILE.
  19 - MPP4.
   6 - RETURN,MPP4.
  20 - UPDATE,F,R,C=COMPILE.
  21 - UNLOAD,OLDPL.
   4 - REWIND,COMPILE.
  22 - FTN,I=COMPILE,L=0,OPT=2,B=MPP5.
   6 - RETURN,COMPILE.
  23 - MPP5.
   6 - RETURN,MPP5.
* 24 - 7/8/9 END OF RECORD CARD
* 25 - 7/8/9 END OF RECORD CARD
* 26 - 7/8/9 END OF RECORD CARD
  27 -      0
  27 - 0.0              3
  27 - 0.0        1500.      100.       1497.      2000.      1515.
  27 -      0
  27 - 500.             4
  27 - 0.0        1501.      20.        1501.8     100.       1498.9     1500.      1510.
  27 -      0
  27 - 1000.            0
  27 -          END OF PROFILES.
  27 -      2     1     1
  27 - 0.0        12000.0      500.0    9000.
  27 - 0.0
  27 - 35.0       0.0          100.0    200.0
* 28 - 7/8/9 END OF RECORD CARD
```

FIGURE 1: MPP EXECUTION DECK

Comment Number:	Card Image:
*29 -	7/8/9 END OF RECORD CARD
30 -	0 0 2 -21
30 -	10.0 -10.
30 -	0.0 60.0 100.
30 -	300. 1000.
*31 -	7/8/9 END OF RECORD CARD
*32 -	7/8/9 END OF RECORD CARD
33 -	0
33 -	0 0
*34 -	7/8/9 END OF RECORD CARD
*35 -	7/8/9 END OF RECORD CARD
36 -	1 1
*37 -	7/8/9 END OF RECORD CARD
*38 -	7/8/9 END OF RECORD CARD
39 -	MPP NORDA BENCHMARK RUN.
39 -	100 1.0 1.0
39 -	1 0
39 -	1 1
39 -	1
39 -	50.
39 -	2
39 -	35.0 100.0
**40 -	6/7/8/9 END OF JOB CARD

* This image represents a card with a 7/8/9 multi-punch in Col. 1.

** This image represents a card with a 6/7/8/9 multi-punch in Col. 1.

FIGURE 1: MPP EXECUTION DECK (continued)

The following comments refer to card images in the MPP execution deck listed in Figure 1.

Comment Number:	Comment:
1	Specify program tape to be used.
2	Mount unlabeled program tape with local file name OLDPL. Density = 800 BPI (HY). No write ring.
3	Create compile file from 1st PL on tape.
4	This card is needed because UPDATE R option inhibits automatic rewind.
5	Create the binary file CFIELD.

Comment Number:	Comment:
6	This is done to minimize mass storage usage.
7	Create compile file from 2nd PL on tape.
8	Create the binary file MPP1.
9	Include CFIELD in the executable module MPP1.
10	Load and execute MPP1. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
11	Create compile file from 3rd PL on tape.
12	Create the binary file MPP2.
13	Load and execute MPP2. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
14	Create compile file from 4th PL on tape.
15	Create the binary file MPP3.
16	Load and execute MPP3. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
17	Create compile file from 5th PL on tape.
18	Create the binary file MPP4.
19	Load and execute MPP4. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
20	Create compile file from 6th PL on tape.
21	Program tape no longer needed.
22	Create the binary file MPP5.
23	Load and execute MPP5. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
24	Updates to CFIELD, if any, follow this card. Updates may be necessary to modify site dependent coding.

Comment Number:	Comment:
25	Updates to MPP1, if any, follow this card. Updates may be necessary to modify site dependent coding.
26	Data for MPP1 follow this card.
27	MPP1 data cards.
28	Updates to MPP2, if any, follow this card. Updates may be necessary to modify site dependent coding.
29	Data for MPP2 follow this card.
30	MPP2 data cards.
31	Updates to MPP3, if any, follow this card. Updates may be necessary to modify site dependent coding.
32	Data for MPP3 follow this card.
33	MPP3 data cards.
34	Updates to MPP4, if any, follow this card. Updates may be necessary to modify site dependent coding.
35	Data for MPP4 follow this card.
36	MPP4 data card.
37	Updates to MPP5, if any, follow this card. Updates may be necessary to modify site dependent coding.
38	Data for MPP5 follow this card.
39	MPP5 data cards.
40	End of deck.

II.6 Output

The expected output from running the MPP execution deck is listed in Figure 2.

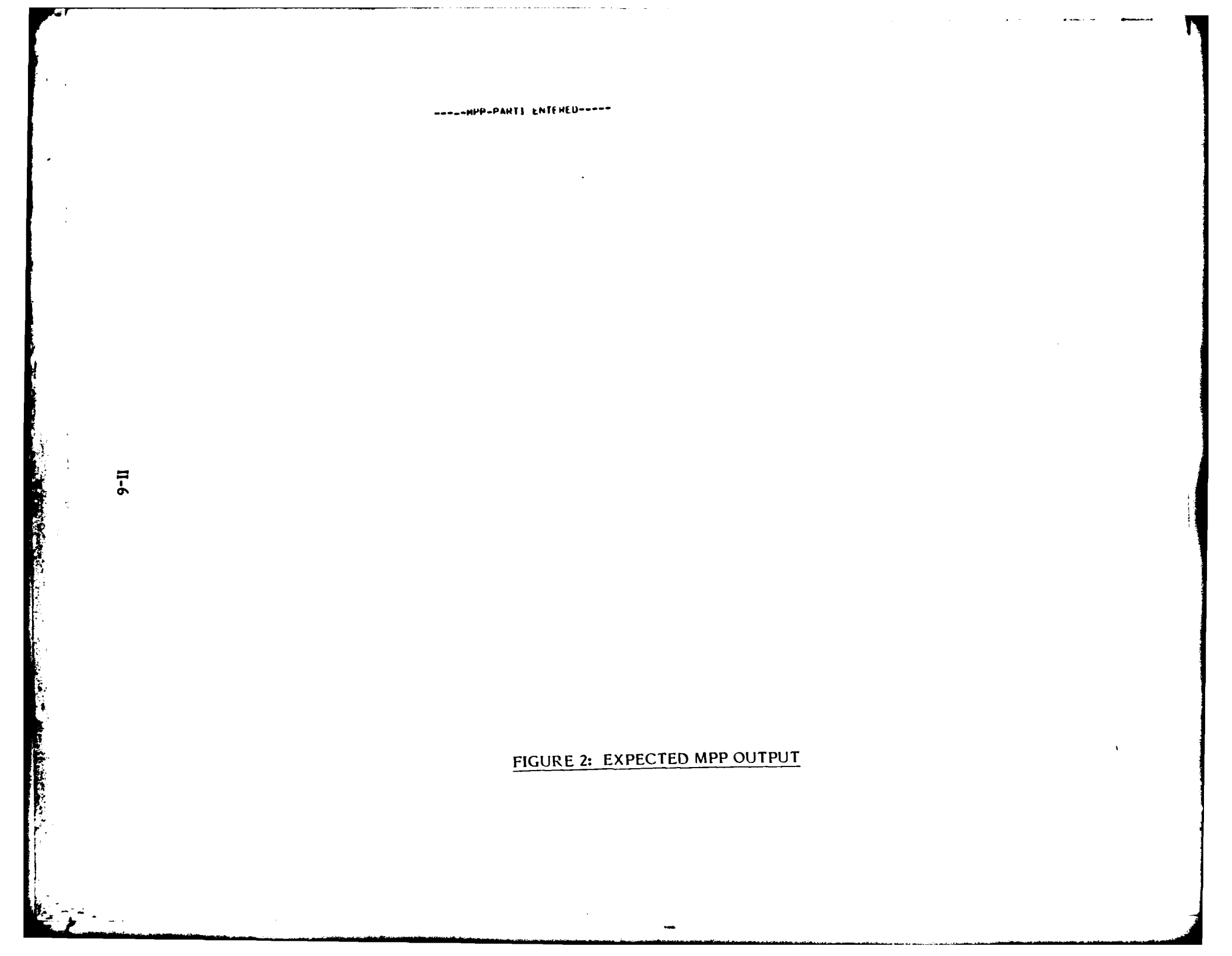


FIGURE 2: EXPECTED MPP OUTPUT

```
                    ----CFIELD ENTERED----

**********************************************************************

                              PROFILE     1
                            RANGE=    0.00 NMI.
          INPUT PROFILE                        SPHERICAL EARTH PROFILE

       DEPTH(M)      SPEED(M/S)        DEPTH(FT)     SPEED(FT/S)     GRAD(1/SEC)
(  1)      0.000        1500.000            0.000        4921.260       -.298E-01
(  2)    100.000        1497.000          328.087        4911.494        .971E-02
(  3)   2000.000        1515.000         6562.710        4972.033        .972E-02
(  4)                                   32834.150        5227.318

     THERE IS(ARE)  0 SPECIFIED CONNECTION(S).
**********************************************************************

                              PROFILE     2
                            RANGE= 500.00 NMI.
          INPUT PROFILE                        SPHERICAL EARTH PROFILE

       DEPTH(M)      SPEED(M/S)        DEPTH(FT)     SPEED(FT/S)     GRAD(1/SEC)
(  1)      0.000        1501.000            0.000        4924.541        .402E-01
(  2)     20.000        1501.800           65.617        4927.181       -.360E-01
(  3)    100.000        1498.900          328.087        4917.728        .816E-02
(  4)   1500.000        1510.000         4921.439        4955.235        .817E-02
(  5)                                   32834.150        5183.297

     THERE IS(ARE)  0 SPECIFIED CONNECTION(S).
**********************************************************************

                              PROFILE     3
                            RANGE=1000.00 NMI.
    SINCE NO POINTS WERE INPUTTED,WE WILL USE THE PREVIOUS PROFILE.

                    ----CFIELD FINISHED----
```


FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
                BOTTOM INFORMATION

NO. OF BATHYMETRY POINTS    =      2
NO. OF BOTTOM LOSS DOMAINS  =      1
BOTTOM LOSS DOMAIN TYPES    =      1

BOTTOM PROFILE
RANGE(NM)   DEPTH(FT)
    0.00     12000.00
  500.00      9000.00

BOTTOM LOSS FUNCTION  1
  RANGE =     0.00 NM

THETAC =     35.000
DH0    =      0.000
DRC    =    100.000
DH90   =    200.000

-----MPP-PART1 TERMINATED NORMALLY.-----
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
     KPRNT  =          0
     JPRNT  =          0
     NDEPS  =          2
     NANGLE =        -21
     INTAPE =          0
     NDELET =          0


     ANGINT =     10.000
     ANGEND =    -10.000
REGINX(NM) =      0.000
REGINY(FT) =     60.000
ENA    (NM) =    100.000
DH150  (DB) =    150.000
WO     (HZ) =     25.000
     YDEP (THE SOURCE DEPTHS)=    300.00
                                 1000.00
```


FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
 THIS IS AN INITIAL RUN

 21 RAYS TO BE TRACED (DEGREES)

                10.0000
                 9.0000
                 8.0000
                 7.0000
                 6.0000
                 5.0000
                 4.0000
                 3.0000
                 2.0000
                 1.0000
                 0.0000
                -1.0000
                -2.0000
                -3.0000
                -4.0000
                -5.0000
                -6.0000
                -7.0000
                -8.0000
                -9.0000
               -10.0000

PROCESSING RAY   1
PROCESSING RAY   2
PROCESSING RAY   3
PROCESSING RAY   4
PROCESSING RAY   5
PROCESSING RAY   6
PROCESSING RAY   7
PROCESSING RAY   8
PROCESSING RAY   9
PROCESSING RAY  10
PROCESSING RAY  11
PROCESSING RAY  12
PROCESSING RAY  13
PROCESSING RAY  14
PROCESSING RAY  15
PROCESSING RAY  16
PROCESSING RAY  17
PROCESSING RAY  18
PROCESSING RAY  19
PROCESSING RAY  20
PROCESSING RAY  21
```


FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
NHWK   = 0
NOPRNT =     0     0
```


FIGURE 2: EXPECTED MPP OUTPUT (continued)

INTENSITY COMBINATION FOR SOURCE AT 300.00 FT

1 ISIG= 000000000000000001

ICOUNT	NSR= 1 INIT ANG	NSH= 0 ARR ANG	I	NRR= 0 ARRIV	NRH= 0 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-10.461	1	1	.332	.416	56.759	0
2	9.000	-9.511	2	1	.368	.461	57.660	0
3	8.000	-8.572	3	1	.413	.516	58.670	0
4	7.000	-7.648	4	1	.470	.586	59.816	0
5	6.000	-6.745	5	1	.545	.677	61.143	0
6	5.000	-5.875	6	1	.646	.802	62.723	0
7	4.000	-5.052	7	1	.793	.982	64.690	0
8	3.000	-4.304	8	1	1.025	1.268	67.378	0
9	2.000	-3.679	9	1	1.488	1.840	72.325	0

2 ISIG= 000000000000100000001

ICOUNT	NSR= 1 INIT ANG	NSH= 0 ARR ANG	I	NRR= 0 ARRIV	NRH= 1 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	10.276	1	2	31.287	38.507	96.730	0
2	9.000	9.326	2	2	28.509	35.120	94.796	0
3	8.000	8.388	3	2	25.789	31.796	93.801	0
4	7.000	7.466	4	2	23.143	28.556	92.674	0
5	6.000	6.565	5	2	20.600	25.434	91.401	0
6	5.000	5.696	6	2	18.199	22.482	89.932	0
7	4.000	4.876	7	2	16.010	19.785	88.177	0
8	3.000	4.133	8	2	14.156	17.499	85.890	0
9	2.000	3.514	9	2	12.930	15.986	80.871	0

3 ISIG= 000000000000100000002

ICOUNT	NSR= 2 INIT ANG	NSH= 0 ARR ANG	I	NRR= 0 ARRIV	NRH= 1 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-10.276	1	3	31.869	39.211	95.719	0
2	9.000	-9.326	2	3	29.132	35.900	94.777	0
3	8.000	-8.388	3	3	26.490	32.671	93.776	0
4	7.000	-7.466	4	3	23.962	29.551	92.631	0
5	6.000	-6.565	5	3	21.528	26.587	91.324	0
6	5.000	-5.696	6	3	19.303	23.850	89.779	0
7	4.000	-4.876	7	3	17.367	21.466	87.815	0
8	3.000	-4.133	8	3	15.920	19.683	84.643	0
9	2.000	-3.514	9	3	15.643	19.341	85.496	1

4 ISIG= 000000000000200000002

ICOUNT	NSR= 2 INIT ANG	NSH= 0 ARR ANG	I	NRR= 0 ARRIV	NRH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	10.114	1	4	62.974	77.527	101.678	1
2	9.000	9.169	2	4	57.462	70.806	100.739	1
3	8.000	8.236	3	4	52.084	64.231	99.726	1
4	7.000	7.319	4	4	46.877	57.850	98.583	1
5	6.000	6.427	5	4	41.903	51.744	97.286	1
6	5.000	5.571	6	4	37.263	46.036	95.770	1
7	4.000	4.771	7	4	33.136	40.953	93.891	1
8	3.000	4.066	8	4	29.913	36.979	90.935	1
9	2.000	3.514	9	4	28.482	35.213	78.582	1

5 ISIG= 000000000000200000003

ICOUNT	NSR= 3 INIT ANG	NSH= 0 ARR ANG	I	NRR= 0 ARRIV	NRH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-10.114	1	5	63.545	78.243	101.671	1
2	9.000	-9.169	2	5	58.097	71.600	100.729	1
3	8.000	-8.236	3	5	52.799	65.124	99.711	1
4	7.000	-7.319	4	5	47.694	58.868	98.559	1
5	6.000	-6.427	5	5	42.855	52.926	97.241	1

FIGURE 2: EXPECTED MPP OUTPUT (continued)

7	4.000	-4.771	7	5	34.537	42.688	93.679	1
8	3.000	-4.066	8	5	31.733	39.231	90.131	1
9	2.000	-3.515	9	5	31.203	38.576	89.748	2

6 ISIG= 000000000003000000003

NSR= 3 NSH= 0 NBR= 0 NBH= 3

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	9.983	1	6	95.068	117.056	105.127	2
2	9.000	9.046	2	6	86.895	107.088	104.180	2
3	8.000	8.125	3	6	78.960	97.386	103.147	2
4	7.000	7.226	4	6	71.349	88.058	101.967	2
5	6.000	6.363	5	6	64.247	79.336	100.531	2
6	5.000	5.571	6	6	58.141	71.826	99.723	2
7	4.000	4.771	7	6	51.565	63.727	97.840	2
8	3.000	4.066	8	6	46.396	57.353	94.967	2
9	2.000	3.514	9	6	44.043	54.449	83.483	3

7 ISIG= 000000000003000000004

NSR= 4 NSH= 0 NBR= 0 NBH= 3

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-9.983	1	7	95.647	117.782	105.123	2
2	9.000	-9.046	2	7	87.540	107.894	104.173	2
3	8.000	-8.125	3	7	79.687	98.292	103.136	2
4	7.000	-7.226	4	7	72.179	89.091	101.949	2
5	6.000	-6.363	5	7	65.210	80.532	100.497	2
6	5.000	-5.571	6	7	59.276	73.234	99.671	2
7	4.000	-4.771	7	7	52.966	65.462	97.715	2
8	3.000	-4.066	8	7	48.216	59.605	94.515	2
9	2.000	-3.515	9	7	46.771	57.822	92.530	3

8 ISIG= 000000000004000000004

NSR= 4 NSH= 0 NBR= 0 NBH= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	7.000	7.226	4	8	97.613	120.464	104.784	3
2	6.000	6.363	5	8	87.665	108.249	103.358	3
3	5.000	5.571	6	8	79.021	97.617	102.430	3
4	4.000	4.771	7	8	69.996	86.502	100.544	3
5	3.000	4.066	8	8	62.880	77.728	97.708	3
6	2.000	3.515	9	8	59.613	73.696	88.933	4

9 ISIG= 000000000004000000005

NSR= 5 NSH= 0 NBR= 0 NBH= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	7.000	-7.226	4	9	98.443	121.497	104.771	3
2	6.000	-6.363	5	9	88.629	109.446	103.336	3
3	5.000	-5.571	6	9	80.156	99.025	102.393	3
4	4.000	-4.771	7	9	71.397	88.238	100.455	3
5	3.000	-4.066	8	9	64.702	79.982	97.393	3
6	2.000	-3.515	9	9	62.348	77.077	94.631	4

10 ISIG= 000000000005000000005

NSR= 5 NSH= 0 NBR= 0 NBH= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	5.000	5.571	6	10	99.902	123.408	104.490	4
2	4.000	4.771	7	10	88.428	109.277	102.603	4
3	3.000	4.066	8	10	79.367	98.105	99.787	4
4	2.000	3.515	9	10	75.191	92.953	92.074	5

11 ISIG= 000000000005000000006

NSR= 6 NSH= 0 NBR= 0 NBH= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	4.000	-4.771	7	11	89.830	111.014	102.535	4
2	3.000	-4.066	8	11	81.190	100.361	99.545	4
3	2.000	-3.515	9	11	77.933	96.342	96.321	5

FIGURE 2: EXPECTED MPP OUTPUT (continued)

NSR= 6 NSH= 0 NHR= 0 NBH= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	3.000	4.066	8	12	95.856	118.485	101.462	5
2	2.000	3.515	9	12	90.778	112.220	94.332	6

13 ISIG= 00000000000600000007

NSR= 7 NSH= 0 NHR= 0 NBH= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	3.000	-4.066	8	13	97.681	120.743	101.266	5
2	2.000	-3.515	9	13	91.525	115.616	97.730	6

14 ISIG= 00000000000000400

NSR= 0 NSH= 1 NHR= 0 NBH= 0

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-1.246	10	1	2.015	2.491	72.218	0
2	0.000	-3.088	11	1	1.465	1.812	69.449	0
3	-1.000	-3.246	12	1	1.066	1.318	66.683	0
4	-2.000	-3.679	13	1	.796	.986	64.158	0
5	-3.000	-4.104	14	1	.619	.766	61.973	0
6	-4.000	-5.052	15	1	.499	.619	60.113	0
7	-5.000	-5.875	16	1	.415	.515	58.523	0
8	-6.000	-6.745	17	1	.354	.440	57.150	0
9	-7.000	-7.648	18	1	.307	.383	55.947	0
10	-8.000	-8.572	19	1	.271	.339	54.882	0
11	-9.000	-9.511	20	1	.242	.304	53.928	0
12	-10.000	-10.461	21	1	.219	.275	53.066	0

15 ISIG= 00000000000100000400

NSR= 0 NSH= 1 NHR= 0 NBH= 1

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	2	12.343	15.261	83.668	1
2	0.000	2.931	11	2	11.328	14.007	78.499	1
3	-1.000	3.083	12	2	11.309	13.984	78.215	0
4	-2.000	3.510	13	2	12.187	15.069	83.414	0
5	-3.000	4.131	14	2	13.726	16.968	86.194	0
6	-4.000	4.875	15	2	15.701	19.403	88.271	0
7	-5.000	5.696	16	2	17.959	22.183	89.972	0
8	-6.000	6.565	17	2	20.403	25.189	91.420	0
9	-7.000	7.465	18	2	22.976	28.367	92.684	0
10	-8.000	8.388	19	2	25.643	31.615	93.808	0
11	-9.000	9.326	20	2	28.380	34.959	94.798	0
12	-10.000	10.276	21	2	31.172	38.363	95.733	0

16 ISIG= 00000000000100001000

NSR= 0 NSH= 2 NHR= 0 NBH= 1

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-3.091	10	3	15.277	18.808	85.375	2
2	0.000	-2.931	11	3	14.109	17.446	79.489	2
3	-1.000	-3.083	12	3	14.235	17.601	81.306	1

17 ISIG= 00000000000200001000

NSR= 0 NSH= 2 NHR= 0 NBH= 2

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	4	26.738	33.058	89.733	3
2	0.000	2.931	11	4	25.054	30.979	82.103	3
3	-1.000	3.083	12	4	25.669	31.739	87.477	2

18 ISIG= 00000000002000001400

NSR= 0 NSH= 3 NHR= 0 NBH= 2

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-3.091	10	5	29.671	36.685	90.622	4
2	0.000	-2.931	11	5	27.836	34.418	82.595	4
3	-1.000	-3.083	12	5	28.595	35.356	88.015	3

19 ISIG= 00000000003000001400

FIGURE 2: EXPECTED MPP OUTPUT (continued)

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	6	41.133	50.856	93.260	5
2	0.000	2.931	11	6	38.782	47.952	86.152	5
3	-1.000	3.083	12	6	40.030	49.493	91.790	4

20 ISIG= 0000000000300002000

NSR= 0 NSH= 4 NHR= 0 NBH= 3

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-3.091	10	7	44.066	54.482	93.861	6
2	0.000	-2.931	11	7	41.563	51.390	86.486	6
3	-1.000	-3.083	12	7	42.956	53.110	92.495	5

21 ISIG= 0000000000400002000

NSR= 0 NSH= 4 NHR= 0 NBH= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	8	55.529	68.653	95.758	7
2	0.000	2.930	11	8	52.509	64.925	85.614	7
3	-1.000	3.083	12	8	54.391	67.249	94.652	6

22 ISIG= 0000000000400002400

NSR= 0 NSH= 5 NHR= 0 NBH= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-3.091	10	9	58.462	72.280	96.214	8
2	0.000	-2.930	11	9	55.291	68.363	85.871	8
3	-1.000	-3.083	12	9	57.317	70.866	95.163	7

23 ISIG= 0000000000500002400

NSR= 0 NSH= 5 NHR= 0 NBH= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	10	69.925	86.451	97.696	9
2	0.000	2.930	11	10	66.238	81.898	86.764	9
3	-1.000	3.082	12	10	68.754	85.004	96.798	8

24 ISIG= 0000000000500003000

NSR= 0 NSH= 6 NHR= 0 NBH= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-3.091	10	11	72.859	90.078	98.062	10
2	0.000	-2.930	11	11	69.020	85.336	86.976	10
3	-1.000	-3.082	12	11	71.680	88.621	97.200	9

25 ISIG= 0000000000600003000

NSR= 0 NSH= 6 NHR= 0 NBH= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	12	84.323	104.250	99.279	11
2	0.000	2.930	11	12	79.968	98.872	87.719	11
3	-1.000	3.082	12	12	83.117	102.761	98.518	10

26 ISIG= 0000000000600003400

NSR= 0 NSH= 7 NHR= 0 NBH= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-3.091	10	13	87.257	107.877	99.586	12
2	0.000	-2.930	11	13	82.750	102.310	87.898	12
3	-1.000	-3.082	12	13	86.043	106.378	98.848	11

27 ISIG= 0000000000700003400

NSR= 0 NSH= 7 NHR= 0 NBH= 7

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	3.091	10	14	98.723	122.051	100.618	13
2	0.000	2.930	11	14	93.700	115.848	88.540	13
3	-1.000	3.082	12	14	97.483	120.519	99.952	12

28 ISIG= 0000000000700004000

NSR= 0 NSH= 8 NHR= 0 NBH= 7

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	0.000	-2.930	11	15	96.481	119.286	88.697	14

FIGURE 2: EXPECTED MPP OUTPUT (continued)

29

ISIG= 0000000000010000401

ICOUNT	NSR= 1 INIT ANG	NSH= 1 ARR ANG	I	NRR= 0 ARRIV	NRH= 1 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-3.510	13	3	14.919	18.446	83.730	1
2	-3.000	-4.131	14	3	15.492	19.153	85.159	0
3	-4.000	-4.875	15	3	17.059	21.085	87.946	0
4	-5.000	-5.696	16	3	19.062	23.552	89.831	0
5	-6.000	-6.565	17	3	21.330	26.341	91.349	0
6	-7.000	-7.465	18	3	23.775	29.342	92.645	0
7	-8.000	-8.388	19	3	26.344	32.490	93.784	0
8	-9.000	-9.326	20	3	29.004	35.740	94.782	0
9	-10.000	-10.276	21	3	31.734	39.067	95.723	0

30

ISIG= 0000000000200000401

ICOUNT	NSR= 1 INIT ANG	NSH= 1 ARR ANG	I	NRR= 0 ARRIV	NRH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	3.510	13	4	27.744	34.301	84.241	1
2	-3.000	4.059	14	4	29.417	36.365	91.285	1
3	-4.000	4.769	15	4	32.801	40.538	93.963	1
4	-5.000	5.570	16	4	37.007	45.719	95.798	1
5	-6.000	6.427	17	4	41.696	51.486	97.299	1
6	-7.000	7.319	18	4	46.702	57.633	98.590	1
7	-8.000	8.235	19	4	51.933	64.044	99.730	1
8	-9.000	9.169	20	4	57.330	70.640	100.742	1
9	-10.000	10.114	21	4	62.856	77.379	101.679	1

31

ISIG= 0000000000200000402

ICOUNT	NSR= 2 INIT ANG	NSH= 1 ARR ANG	I	NRR= 0 ARRIV	NRH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-3.510	13	5	30.483	37.687	88.819	2
2	-3.000	-4.059	14	5	31.242	38.624	90.575	1
3	-4.000	-4.769	15	5	34.203	42.274	93.763	1
4	-5.000	-5.570	16	5	38.142	47.127	95.713	1
5	-6.000	-6.427	17	5	42.647	52.668	97.256	1
6	-7.000	-7.319	18	5	47.520	58.651	98.566	1
7	-8.000	-8.235	19	5	52.649	64.936	99.716	1
8	-9.000	-9.169	20	5	57.965	71.435	100.732	1
9	-10.000	-10.114	21	5	63.427	78.095	101.673	1

32

ISIG= 0000000000300000402

ICOUNT	NSR= 2 INIT ANG	NSH= 1 ARR ANG	I	NRR= 0 ARRIV	NRH= 3 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	3.510	13	6	43.309	53.542	72.218	2
2	-3.000	4.059	14	6	45.883	56.719	95.196	2
3	-4.000	4.768	15	6	51.222	63.302	97.887	2
4	-5.000	5.570	16	6	57.881	71.504	99.741	2
5	-6.000	6.361	17	6	64.017	79.052	100.552	2
6	-7.000	7.225	18	6	71.163	87.827	101.975	2
7	-8.000	8.124	19	6	78.802	97.189	103.151	2
8	-9.000	9.046	20	6	86.757	106.916	104.183	2
9	-10.000	9.983	21	6	94.946	116.903	105.129	2

33

ISIG= 0000000000300000403

ICOUNT	NSR= 3 INIT ANG	NSH= 1 ARR ANG	I	NRR= 0 ARRIV	NRH= 3 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-3.510	13	7	46.056	56.939	92.031	3
2	-3.000	-4.059	14	7	47.709	58.978	94.774	2
3	-4.000	-4.769	15	7	52.624	65.039	97.766	2
4	-5.000	-5.570	16	7	59.016	72.912	99.690	2
5	-6.000	-6.361	17	7	64.981	80.268	100.519	2
6	-7.000	-7.225	18	7	71.993	88.860	101.957	2
7	-8.000	-8.124	19	7	79.529	98.095	103.140	2
8	-9.000	-9.046	20	7	87.402	107.722	104.176	2
9	-10.000	-9.983	21	7	95.525	117.629	105.124	2

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
34                                  ISIG= 000000000004000004U3
                    NSR=  3         NSM=  1        NRR=  U        NRM=  4
ICOUNT    INIT ANG      ARR ANG      I     ARRIV      R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)    NC(I,ARRIV)
   1       -2.000        3.510      13       8         58.883         72.795         87.381          4
   2       -3.000        4.059      14       8         62.351         77.074         97.883          3
   3       -4.000        4.768      15       8         69.645         86.068        100.580          3
   4       -5.000        5.570      16       8         78.756         97.289        102.443          3
   5       -6.000        6.361      17       8         87.630        107.958        103.375          3
   6       -7.000        7.225      18       8         97.424        120.229        104.789          3

35                                  ISIG= 000000000004000000404
                    NSR=  4         NSM=  1        NRR=  U        NRM=  4
ICOUNT    INIT ANG      ARR ANG      I     ARRIV      R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)    NC(I,ARRIV)
   1       -2.000       -3.510      13       9         61.638         76.200         94.389          4
   2       -3.000       -4.059      14       9         64.178         79.335         97.582          3
   3       -4.000       -4.769      15       9         71.048         87.805        100.493          3
   4       -5.000       -5.570      16       9         79.892         98.698        102.407          3
   5       -6.000       -6.361      17       9         88.394        109.154        103.352          3
   6       -7.000       -7.225      18       9         98.254        121.262        104.777          3

36                                  ISIG= 000000000005000000404
                    NSR=  4         NSM=  1        NRR=  0        NRM=  5
ICOUNT    INIT ANG      ARR ANG      I     ARRIV      R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)    NC(I,ARRIV)
   1       -2.000        3.510      13      10         74.467         92.058         91.559          5
   2       -3.000        4.059      14      10         78.821         97.431         99.931          4
   3       -4.000        4.768      15      10         88.870        108.834        102.632          4
   4       -5.000        5.570      16      10         99.633        121.075        104.501          4

37                                  ISIG= 000000U00005000000405
                    NSR=  5         NSM=  1        NRR=  0        NRM=  5
ICOUNT    INIT ANG      ARR ANG      I     ARRIV      R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)    NC(I,ARRIV)
   1       -2.000       -3.511      13      11         77.227         95.471         96.268          5
   2       -3.000       -4.059      14      11         80.650         99.694         99.697          4
   3       -4.000       -4.769      15      11         89.473        110.572        102.565          4

38                                  ISIG= 000000000006000003405
                    NSR=  5         NSM=  1        NRR=  U        NRM=  6
ICOUNT    INIT ANG      ARR ANG      I     ARRIV      R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)    NC(I,ARRIV)
   1       -2.000        3.510      13      12         90.058        111.331         96.206          6
   2       -3.000        4.059      14      12         95.294        117.791        101.586          5

39                                  ISIG= 000000U00006000000406
                    NSR=  6         NSM=  1        NRR=  0        NRM=  6
ICOUNT    INIT ANG      ARR ANG      I     ARRIV      R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)    NC(I,ARRIV)
   1       -2.000       -3.511      13      13         92.825        114.751         97.774          6
   2       -3.000       -4.059      14      13         97.125        120.056        101.394          5

HE NUMBER OF ARRIVALS REFERENCED THIS RUN--
   ---NFCOND GETS=   300
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

INTENSITY COMBINATION FOR SOURCE AT 1000.00 FT

1 ISIG= 000000000000000000001

ICOUNT	NSR= 1 INIT ANG	NSH= 0 ARR ANG	I	NBH= 0 ARRIV	NBH= 0 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-10.098	1	1	.965	1.212	65.781	0
2	9.000	-9.109	2	1	1.068	1.337	66.602	0
3	8.000	-8.124	3	1	1.196	1.492	67.500	0
4	7.000	-7.142	4	1	1.352	1.685	68.489	0
5	6.000	-6.166	5	1	1.554	1.933	69.584	0
6	5.000	-5.200	6	1	1.821	2.261	70.801	0
7	4.000	-4.250	7	1	2.186	2.711	72.165	0
8	3.000	-3.333	8	1	2.711	3.358	73.746	0
9	2.000	-2.488	9	1	3.554	4.398	76.298	0

2 ISIG= 000000000001000000001

ICOUNT	NSR= 1 INIT ANG	NSH= 0 ARR ANG	I	NBH= 0 ARRIV	NBH= 1 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	9.972	1	2	30.644	37.699	95.607	0
2	9.000	8.990	2	2	27.797	34.229	94.644	0
3	8.000	8.012	3	2	24.993	30.803	93.615	0
4	7.000	7.039	4	2	22.244	27.435	92.438	0
5	6.000	6.075	5	2	19.569	24.150	91.097	0
6	5.000	5.123	6	2	16.996	20.987	89.531	0
7	4.000	4.192	7	2	14.579	18.010	87.639	0
8	3.000	3.298	8	2	12.420	15.348	85.196	0
9	2.000	2.478	9	2	10.797	13.345	80.786	0

3 ISIG= 000000000001000000002

ICOUNT	NSR= 2 INIT ANG	NSH= 0 ARR ANG	I	NBH= 0 ARRIV	NBH= 1 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-9.972	1	3	32.492	40.019	95.577	0
2	9.000	-8.990	2	3	29.844	36.792	94.599	0
3	8.000	-8.012	3	3	27.285	33.665	93.568	0
4	7.000	-7.039	4	3	24.842	30.672	92.329	0
5	6.000	-6.075	5	3	22.560	27.870	90.904	0
6	5.000	-5.124	6	3	20.506	25.345	89.157	0
7	4.000	-4.192	7	3	18.798	23.241	86.792	0
8	3.000	-3.298	8	3	17.656	21.834	82.403	0
9	2.000	-2.478	9	3	17.776	21.981	85.597	1

4 ISIG= 000000000002000000002

ICOUNT	NSR= 2 INIT ANG	NSH= 0 ARR ANG	I	NBH= 0 ARRIV	NBH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	9.806	1	4	62.321	76.706	101.569	1
2	9.000	8.826	2	4	56.737	69.899	100.581	1
3	8.000	7.852	3	4	51.273	63.218	99.530	1
4	7.000	6.886	4	4	45.958	56.706	98.334	1
5	6.000	5.926	5	4	40.868	50.431	96.961	1
6	5.000	4.984	6	4	36.030	44.505	95.336	1
7	4.000	4.070	7	4	31.670	39.134	93.303	1
8	3.000	3.213	8	4	28.143	34.785	90.200	1
9	2.000	2.478	9	4	26.369	32.572	82.143	1

5 ISIG= 000000000002000000003

ICOUNT	NSR= 3 INIT ANG	NSH= 0 ARR ANG	I	NBH= 0 ARRIV	NBH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	10.000	-9.806	1	5	64.199	79.063	101.532	1
2	9.000	-8.821	2	5	58.422	72.507	100.556	1
3	8.000	-7.852	3	5	53.010	66.136	99.491	1
4	7.000	-6.886	4	5	48.013	60.012	98.270	1
5	6.000	-5.926	5	5	43.910	54.238	96.850	1

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
     7      4.000     -4.070     7     5      36.004      44.507      92.819      1
     8      3.000     -3.213     8     5      33.504      41.425      88.523      1
     9      2.000     -2.479     9     5      33.335      41.217      89.339      2

6                              ISIG= 000000000000300000003
                 NSR=  3      NSH=  0      NBR=  0      NBH=  3
 ICOUNT      INIT ANG     ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
      1        10.000      9.670      1      6        94.405         116.225        104.994         2
      2         9.000      8.699      2      6        86.160         106.169        104.017         2
      3         8.000      7.736      3      6        78.118         96.359         102.944         2
      4         7.000      6.785      4      6        70.418         86.898         101.709         2
      5         6.000      5.856      5      6        63.180         78.010         100.196         2
      6         5.000      4.984      6      6        56.908         70.296         99.271          2
      7         4.000      4.070      7      6        50.099         61.908         97.214          2
      8         3.000      3.213      8      6        44.625         55.159         94.124          2
      9         2.000      2.479      9      6        41.910         51.809         75.542          2

7                              ISIG= 000000000000300000004
                 NSR=  4      NSH=  0      NBR=  0      NBH=  3
 ICOUNT      INIT ANG     ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
      1        10.000     -9.670      1      7        96.310         118.614        104.981         2
      2         9.000     -8.699      2      7        88.275         108.814        103.997         2
      3         8.000     -7.736      3      7        80.509         99.319         102.914         2
      4         7.000     -6.785      4      7        73.110         90.251         101.659         2
      5         6.000     -5.857      5      7        66.277         81.859         100.107         2
      6         5.000     -4.984      6      7        60.509         74.765         99.148          2
      7         4.000     -4.070      7      7        54.433         67.281         96.935          2
      8         3.000     -3.213      8      7        49.987         61.799         93.215          2
      9         2.000     -2.479      9      7        48.903         60.462         91.868          3

8                              ISIG= 000000000004000000004
                 NSR=  4      NSH=  0      NBR=  0      NBH=  4
 ICOUNT      INIT ANG     ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
      1         7.000      6.785      4      8        96.682         119.304        104.520         3
      2         6.000      5.856      5      8        86.598         106.923        103.015         3
      3         5.000      4.984      6      8        77.788         96.086         101.969         3
      4         4.000      4.070      7      8        68.529         84.683         99.902          3
      5         3.000      3.213      8      8        61.109         75.534         96.816          3
      6         2.000      2.479      9      8        57.480         71.056         84.439          4

9                              ISIG= 000000000004000000005
                 NSR=  5      NSH=  0      NBR=  0      NBH=  4
 ICOUNT      INIT ANG     ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
      1         7.000     -6.785      4      9        99.374         122.657        104.488         3
      2         6.000     -5.857      5      9        89.696         110.772        102.958         3
      3         5.000     -4.985      6      9        81.389         100.556        101.883         3
      4         4.000     -4.070      7      9        72.864         90.056         99.706          3
      5         3.000     -3.214      8      9        66.472         82.176         96.193          3
      6         2.000     -2.479      9      9        64.480         79.717         93.811          4

10                             ISIG= 000000000005000000005
                 NSR=  5      NSH=  0      NBR=  0      NBH=  5
 ICOUNT      INIT ANG     ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
      1         5.000      4.984      6      10       98.669         121.878        104.025         4
      2         4.000      4.070      7      10       86.961         107.459        101.951         4
      3         3.000      3.214      8      10       77.596         95.912         98.867          4
      4         2.000      2.479      9      10       73.059         90.313         88.935          5

11                             ISIG= 000000000005000000006
                 NSR=  6      NSH=  0      NBR=  0      NBH=  5
 ICOUNT      INIT ANG     ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
      1         4.000     -4.070      7      11       91.297         112.832        101.800         4
      2         3.000     -3.214      8      11       82.960         102.555        98.394          4
      3         2.000     -2.480      9      11       80.065         98.982         95.393          5
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
                NSR= 6          NSH= 0          NRR= 0          NRH= 6
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          3.000          3.214      8      12        94.086         116.292        100.525          5
   2          2.000          2.440      9      12        88.646         109.580        91.694           6

13                          ISIG= 0000000000600000007
                NSR= 7          NSH= 0          NRR= 0          NRH= 6
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          3.000         -3.214      8      13        99.452         122.936        100.143          5
   2          2.000         -2.480      9      13        95.657         118.255        96.724           6

14                          ISIG= 0000000000000000400
                NSR= 0          NSH= 1          NRR= 0          NRH= 0
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          1.000         -1.813     10       1         4.498          5.564          68.558          0
   2          0.000         -1.483     11       1         4.197          5.192          70.647          0
   3         -1.000         -1.769     12       1         3.577          4.426          72.743          0
   4         -2.000         -2.466     13       1         2.873          3.557          72.741          0
   5         -3.000         -3.323     14       1         2.308          2.860          71.831          0
   6         -4.000         -4.245     15       1         1.894          2.349          70.659          0
   7         -5.000         -5.197     16       1         1.590          1.975          69.469          0
   8         -6.000         -6.164     17       1         1.363          1.696          68.342          0
   9         -7.000         -7.140     18       1         1.189          1.483          67.300          0
  10         -8.000         -8.122     19       1         1.052          1.315          66.346          0
  11         -9.000         -9.108     20       1          .942          1.180          65.471          0
  12        -10.000        -10.097     21       1          .852          1.070          64.667          0

15                          ISIG= 0000000000100000400
                NSR= 0          NSH= 1          NRR= 0          NRH= 1
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          1.000          1.813     10       2         9.774         12.082          81.394          1
   2          0.000          1.483     11       2         8.512         10.523          74.405          1
   3         -1.000          1.769     12       2         8.725         10.786          77.424          0
   4         -2.000          2.466     13       2        10.051         12.423          82.360          0
   5         -3.000          3.295     14       2        11.989         14.816          85.407          0
   6         -4.000          4.191     15       2        14.270         17.628          87.709          0
   7         -5.000          5.123     16       2        16.755         20.689          89.558          0
   8         -6.000          6.075     17       2        19.371         23.905          91.110          0
   9         -7.000          7.039     18       2        22.076         27.226          92.446          0
  10         -8.000          8.012     19       2        24.848         30.621          93.619          0
  11         -9.000          8.990     20       2        27.668         34.068          94.647          0
  12        -10.000          9.972     21       2        30.529         37.555          95.609          0

16                          ISIG= 0000000000100001000
                NSR= 0          NSH= 2          NRR= 0          NRH= 1
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          1.000         -1.828     10       3        17.845         22.067          82.650          2
   2          0.000         -1.542     11       3        16.916         20.919          77.424          2
   3         -1.000         -1.814     12       3        16.814         20.793          76.409          1

17                          ISIG= 0000000000200001000
                NSR= 0          NSH= 2          NRR= 0          NRH= 2
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          1.000          1.828     10       4        24.169         29.879          87.607          3
   2          0.000          1.542     11       4        22.247         27.506          78.861          3
   3         -1.000          1.814     12       4        23.089         28.546          85.625          2

18                          ISIG= 0000000000200001400
                NSR= 0          NSH= 3          NRR= 0          NRH= 2
ICOUNT      INIT ANG        ARR ANG     I     ARRIV     R(I,ARRIV)     T(I,ARRIV)     TL(I,ARRIV)     NC(I,ARRIV)
   1          1.000         -1.829     10       5        32.240         39.864          88.089          4
   2          0.000         -1.542     11       5        30.642         37.891          80.162          4
   3         -1.000         -1.815     12       5        31.174         38.548          85.724          3

19                          ISIG= 0000000000300001400
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	1.829	10	6	38.564	47.677	91.114	5
2	0.000	1.542	11	6	35.975	44.479	81.098	5
3	-1.000	1.815	12	6	37.450	46.301	89.748	4

20 ISIG= 0000000000030000002000

NSR= 0 NSH= 4 NBR= 0 NBH= 3

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-1.829	10	7	46.635	57.661	91.406	6
2	0.000	-1.542	11	7	44.370	54.863	81.923	6
3	-1.000	-1.815	12	7	45.535	56.302	89.881	5

21 ISIG= 0000000000040000002000

NSR= 0 NSH= 4 NBR= 0 NBH= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	1.829	10	8	52.940	65.475	93.592	7
2	0.000	1.542	11	8	49.703	61.452	82.646	7
3	-1.000	1.815	12	8	51.812	64.057	92.533	6

22 ISIG= 0000000000040000002400

NSR= 0 NSH= 5 NBR= 0 NBH= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-1.829	10	9	61.031	75.458	93.800	8
2	0.000	-1.542	11	9	58.097	71.835	83.241	8
3	-1.000	-1.815	12	9	59.897	74.057	92.653	7

23 ISIG= 0000000000050000002400

NSR= 0 NSH= 5 NBR= 0 NBH= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	1.829	10	10	67.357	83.273	95.514	9
2	0.000	1.542	11	10	63.432	78.425	83.846	9
3	-1.000	1.815	12	10	66.174	81.813	94.639	8

24 ISIG= 0000000000050000003000

NSR= 0 NSH= 6 NBR= 0 NBH= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-1.829	10	11	75.428	93.256	95.675	10
2	0.000	-1.543	11	11	71.826	88.809	84.305	10
3	-1.000	-1.815	12	11	74.259	91.813	94.744	9

25 ISIG= 0000000000060000003000

NSR= 0 NSH= 6 NBR= 0 NBH= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	1.829	10	12	81.755	101.072	97.084	11
2	0.000	1.542	11	12	77.162	95.399	84.832	11
3	-1.000	1.815	12	12	80.538	99.569	96.332	10

26 ISIG= 0000000000060000003400

NSR= 0 NSH= 7 NBR= 0 NBH= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	-1.829	10	13	89.826	111.055	97.215	12
2	0.000	-1.543	11	13	85.556	105.783	85.203	12
3	-1.000	-1.815	12	13	88.623	109.569	96.424	11

27 ISIG= 0000000000070000003400

NSR= 0 NSH= 7 NBR= 0 NBH= 7

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	1.000	1.829	10	14	96.154	118.872	98.413	13
2	0.000	1.542	11	14	90.893	112.375	85.675	13
3	-1.000	1.815	12	14	94.903	117.327	97.748	12

28 ISIG= 0000000000070000043000

NSR= 0 NSH= 8 NBR= 0 NBH= 7

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	0.000	-1.543	11	15	99.288	122.758	85.983	14

FIGURE 2: EXPECTED MPP OUTPUT (continued)

29

ISIG= 0000000000010000401

ICOUNT	NSR= 1 INIT ANG	NSH= 1 ARR ANG	I	NBR= 0 ARRIV	NHH= 1 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-2.472	13	3	17.056	21.091	84.257	1
2	-3.000	-3.205	14	3	17.229	21.305	83.201	0
3	-4.000	-4.191	15	3	18.490	22.866	88.965	0
4	-5.000	-5.121	16	3	20.265	25.067	89.223	0
5	-6.000	-6.075	17	3	22.362	27.665	90.935	0
6	-7.000	-7.039	18	3	24.674	30.464	92.346	0
7	-8.000	-8.012	19	3	27.140	33.483	93.558	0
8	-9.000	-8.990	20	3	29.715	36.631	94.606	0
9	-10.000	-9.972	21	3	32.377	39.875	95.582	0

30

ISIG= 0000000000020000401

ICOUNT	NSR= 1 INIT ANG	NSH= 1 ARR ANG	I	NBR= 0 ARRIV	NHH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	2.472	13	4	25.607	31.655	84.584	1
2	-3.000	3.205	14	4	27.642	34.167	90.500	1
3	-4.000	4.067	15	4	31.333	38.718	93.366	1
4	-5.000	4.983	16	4	35.773	44.187	95.360	1
5	-6.000	5.925	17	4	40.640	50.173	96.972	1
6	-7.000	6.884	18	4	45.783	56.489	98.340	1
7	-8.000	7.852	19	4	51.127	63.031	99.534	1
8	-9.000	8.828	20	4	56.605	69.733	100.584	1
9	-10.000	9.805	21	4	62.203	76.558	101.550	1

31

ISIG= 0000000000200000402

ICOUNT	NSR= 2 INIT ANG	NSH= 1 ARR ANG	I	NBR= 0 ARRIV	NHH= 2 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-2.472	13	5	32.619	40.332	88.576	2
2	-3.000	-3.205	14	5	33.016	40.822	89.053	1
3	-4.000	-4.067	15	5	35.670	44.094	92.913	1
4	-5.000	-4.983	16	5	39.375	48.658	95.157	1
5	-6.000	-5.926	17	5	43.703	53.981	96.866	1
6	-7.000	-6.884	18	5	48.438	59.796	98.279	1
7	-8.000	-7.852	19	5	53.460	65.949	99.496	1
8	-9.000	-8.828	20	5	58.690	72.342	100.559	1
9	-10.000	-9.806	21	5	64.081	78.915	101.534	1

32

ISIG= 0000000000300000402

ICOUNT	NSR= 2 INIT ANG	NSH= 1 ARR ANG	I	NBR= 0 ARRIV	NHH= 3 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	2.472	13	6	41.173	50.898	82.910	2
2	-3.000	3.205	14	6	44.108	54.521	94.331	2
3	-4.000	4.067	15	6	49.754	61.483	97.257	2
4	-5.000	4.983	16	6	56.647	69.972	99.287	2
5	-6.000	5.954	17	6	62.950	77.725	100.216	2
6	-7.000	6.884	18	6	70.232	86.667	101.716	2
7	-8.000	7.735	19	6	77.980	96.162	102.948	2
8	-9.000	8.698	20	6	86.022	105.997	104.020	2
9	-10.000	9.670	21	6	94.283	116.072	104.996	2

33

ISIG= 0000000000300000403

ICOUNT	NSR= 3 INIT ANG	NSH= 1 ARR ANG	I	NBR= 0 ARRIV	NHH= 3 R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-2.473	13	7	48.192	59.583	91.438	3
2	-3.000	-3.205	14	7	49.483	61.176	93.496	2
3	-4.000	-4.067	15	7	54.092	66.859	96.990	2
4	-5.000	-4.983	16	7	60.249	74.443	99.168	2
5	-6.000	-5.955	17	7	66.048	81.575	100.130	2
6	-7.000	-6.784	18	7	72.925	90.020	101.668	2
7	-8.000	-7.735	19	7	80.351	99.122	102.918	2
8	-9.000	-8.698	20	7	88.137	108.642	104.000	2
9	-10.000	-9.670	21	7	96.188	118.461	104.983	2

FIGURE 2: EXPECTED MPP OUTPUT (continued)

NSR= 3 NSH= 1 NBR= 0 NHM= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	2.473	13	8	56.747	70.151	80.711	4
2	-3.000	3.205	14	8	60.576	74.876	96.977	3
3	-4.000	4.067	15	8	64.177	84.248	99.935	3
4	-5.000	4.983	16	8	77.523	95.758	101.982	3
5	-6.000	5.855	17	8	86.363	105.631	103.031	3
6	-7.000	6.784	18	8	96.492	119.069	104.526	3

35 ISIG= 000000000004000000404

NSR= 4 NSH= 1 NBR= 0 NHM= 4

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-2.473	13	9	63.773	78.845	93.595	4
2	-3.000	-3.205	14	9	65.952	81.533	96.390	3
3	-4.000	-4.067	15	9	72.515	89.625	99.745	3
4	-5.000	-4.983	16	9	81.125	100.229	101.898	3
5	-6.000	-5.855	17	9	89.461	110.481	102.974	3
6	-7.000	-6.784	18	9	99.185	122.422	104.494	3

36 ISIG= 000000000005000000404

NSR= 4 NSH= 1 NBR= 0 NHM= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	2.473	13	10	72.331	89.414	88.174	5
2	-3.000	3.205	14	10	77.047	95.233	99.001	4
3	-4.000	4.067	15	10	86.602	107.014	101.978	4
4	-5.000	4.983	16	10	98.400	121.544	104.035	4

37 ISIG= 000000000005000000405

NSR= 5 NSH= 1 NBR= 0 NHM= 5

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-2.474	13	11	79.363	98.115	95.324	5
2	-3.000	-3.205	14	11	82.424	101.892	98.548	4
3	-4.000	-4.067	15	11	90.960	112.392	101.831	4

38 ISIG= 000000000006000000405

NSR= 5 NSH= 1 NBR= 0 NHM= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	2.474	13	12	87.923	108.687	91.522	6
2	-3.000	3.205	14	12	93.520	115.593	100.641	5

39 ISIG= 000000000006000000406

NSR= 6 NSH= 1 NBR= 0 NHM= 6

ICOUNT	INIT ANG	ARR ANG	I	ARRIV	R(I,ARRIV)	T(I,ARRIV)	TL(I,ARRIV)	NC(I,ARRIV)
1	-2.000	-2.474	13	13	94.960	117.394	96.761	6
2	-3.000	-3.206	14	13	98.899	122.253	100.271	5

HE NUMBER OF ARRIVALS REFERENCED THIS RUN--
---RECORD GETS= 298

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
                    CAUSTIC PARAMETERS FOR SOURCE DEPTH=  300.00 FT

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)= 12   NMM= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= -.1745E-01  BK(2,1)= -.1745E-01  BK(1,2)=  .3432E-01  BK(2,2)= -.3505E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   = -.1000E+01  THS1   =  0.         THS2   =  0.         THSC   =  .3081E+01
  R1     =  .1234E+02  R2     =  .3117E+02  RC     =  .1131E+02  T1     =  .1526E+02  T2     =  .1697E+02  TC     =  .1398E+02
  X17    =  .3646E-07  AA     =  0.         ALPHA  =  .2102E-01  TAU1   =  .1235E+01  TAU2   = -.1233E-03

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1345E-01  BK(2,2)= -.2226E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   =  .2931E+01
  R1     =  .2674E+02  R2     =  .2567E+02  RC     =  .2505E+02  T1     =  .3306E+02  T2     =  .3174E+02  TC     =  .3098E+02
  X17    =  .3655E-07  AA     =  0.         ALPHA  =  .2412E-02  TAU1   =  .1235E+01  TAU2   = -.1257E-04

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1288E-01  BK(2,2)= -.2003E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   = -.2931E+01
  R1     =  .2967E+02  R2     =  .2859E+02  RC     =  .2784E+02  T1     =  .3669E+02  T2     =  .3534E+02  TC     =  .3442E+02
  X17    =  .3417E-07  AA     =  0.         ALPHA  =  .1984E-02  TAU1   =  .1235E+01  TAU2   = -.9374E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1138E-01  BK(2,2)= -.1562E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   =  .2931E+01
  R1     =  .4113E+02  R2     =  .4003E+02  RC     =  .3878E+02  T1     =  .5086E+02  T2     =  .4949E+02  TC     =  .4795E+02
  X17    =  .2870E-07  AA     =  0.         ALPHA  =  .1189E-02  TAU1   =  .1235E+01  TAU2   = -.4352E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1103E-01  BK(2,2)= -.1479E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   = -.2931E+01
  R1     =  .4407E+02  R2     =  .4296E+02  RC     =  .4156E+02  T1     =  .5448E+02  T2     =  .5311E+02  TC     =  .5139E+02
  X17    =  .2754E-07  AA     =  0.         ALPHA  =  .1046E-02  TAU1   =  .1235E+01  TAU2   = -.3591E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1004E-01  BK(2,2)= -.1272E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   =  .2930E+01
  R1     =  .5553E+02  R2     =  .5439E+02  RC     =  .5251E+02  T1     =  .6865E+02  T2     =  .6725E+02  TC     =  .6492E+02
  X17    =  .2446E-07  AA     =  0.         ALPHA  =  .7030E-03  TAU1   =  .1235E+01  TAU2   = -.1978E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINT  (Y FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .9800E-02  BK(2,2)= -.1226E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   = -.2930E+01
  R1     =  .5846E+02  R2     =  .5732E+02  RC     =  .5529E+02  T1     =  .7228E+02  T2     =  .7087E+02  TC     =  .6836E+02
  X17    =  .2374E-07  AA     =  0.         ALPHA  =  .6277E-03  TAU1   =  .1235E+01  TAU2   = -.1668E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .9089E-02  BK(2,2)= -.1100E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   =  .2930E+01
  R1     =  .6993E+02  R2     =  .6875E+02  RC     =  .6624E+02  T1     =  .8645E+02  T2     =  .8500E+02  TC     =  .8190E+02
  X17    =  .2169E-07  AA     =  0.         ALPHA  =  .4247E-03  TAU1   =  .1235E+01  TAU2   = -.9287E-06

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .8907E-02  BK(2,2)= -.1070E-01  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   =  0.         THR2   =  0.         THRC   =  0.         THS1   =  0.         THS2   =  0.         THSC   = -.2930E+01
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
   X17    =  .2119E-07  AA     = 0.          ALPHA  =  .3752E-03  TAU1   =  .1235E+01  TAU2   = -.7711E-06

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .8363E-02  BK(2,2)= -.9835E-02  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .2930E+01
   R1     =  .8432E+02  R2     =  .8312E+02  RC     =  .7997E+02  T1     =  .1043E+03  T2     =  .1029E+03  TC     =  .9887E+02
   X17    =  .1970E-07  AA     = 0.          ALPHA  =  .2293E-03  TAU1   =  .1235E+01  TAU2   = -.1683E-06

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .8220E-02  BK(2,2)= -.9616E-02  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   = -.2930E+01
   R1     =  .8726E+02  R2     =  .8604E+02  RC     =  .8275E+02  T1     =  .1079E+03  T2     =  .1064E+03  TC     =  .1023E+03
   X17    =  .1932E-07  AA     = 0.          ALPHA  =  .1897E-03  TAU1   =  .1235E+01  TAU2   = -.2771E-06

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .7787E-02  BK(2,2)= -.8974E-02  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .2930E+01
   R1     =  .9872E+02  R2     =  .9748E+02  RC     =  .9370E+02  T1     =  .1221E+03  T2     =  .1205E+03  TC     =  .1158E+03
   X17    =  .1817E-07  AA     = 0.          ALPHA  =  .4633E-04  TAU1   =  .1235E+01  TAU2   = -.3345E-07
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
                    CAUSTIC PARAMETERS FOR SOURCE DEPTH= 1000.00 FT

JFAM=2   IFAM(FAMILY TYPE)=1   K(NO. OF POINTS IN FAMILY)=  4   NBB= 0   ISURF=2   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)=  .5234E-01  BK(2,1)=  .5234E-01  BK(1,2)= -.5045E-01  BK(2,2)=  .3150E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   =  .3000E+01  THS1   = 0.          THS2   = 0.          THSC   = -.3294E+01
   R1     =  .1778E+02  R2     =  .3249E+02  RC     =  .1766E+02  T1     =  .2194E+02  T2     =  .2324E+02  TC     =  .2181E+02
   XI7    =  .3517E-07  AA     = 0.          ALPHA  =  .6555E-01  TAU1   =  .1235E+01  TAU2   = -.1781E-02

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)= 12   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1554E-01  BK(2,2)= -.3701E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1483E+01
   R1     =  .9774E+01  R2     =  .3053E+02  RC     =  .8512E+01  T1     =  .1208E+02  T2     =  .1242E+02  TC     =  .1052E+02
   XI7    =  .4471E-07  AA     = 0.          ALPHA  =  .1167E-01  TAU1   =  .1235E+01  TAU2   = -.1337E-03

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1259E-01  BK(2,2)= -.1902E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1542E+01
   R1     =  .2417E+02  R2     =  .2309E+02  RC     =  .2225E+02  T1     =  .2988E+02  T2     =  .2855E+02  TC     =  .2751E+02
   XI7    =  .5918E-07  AA     = 0.          ALPHA  =  .1766E-02  TAU1   =  .1235E+01  TAU2   = -.7877E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1085E-01  BK(2,2)= -.1437E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1542E+01
   R1     =  .3856E+02  R2     =  .3745E+02  RC     =  .3597E+02  T1     =  .4768E+02  T2     =  .4630E+02  TC     =  .4448E+02
   XI7    =  .4827E-07  AA     = 0.          ALPHA  =  .9625E-03  TAU1   =  .1235E+01  TAU2   = -.3168E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1160E-01  BK(2,2)= -.1617E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   = -.1542E+01
   R1     =  .4663E+02  R2     =  .4554E+02  RC     =  .4437E+02  T1     =  .5766E+02  T2     =  .5630E+02  TC     =  .5486E+02
   XI7    =  .5274E-07  AA     = 0.          ALPHA  =  .1302E-02  TAU1   =  .1235E+01  TAU2   = -.4984E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .9670E-02  BK(2,2)= -.1202E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1542E+01
   R1     =  .5296E+02  R2     =  .5181E+02  RC     =  .4970E+02  T1     =  .6547E+02  T2     =  .6406E+02  TC     =  .6145E+02
   XI7    =  .4185E-07  AA     = 0.          ALPHA  =  .5813E-03  TAU1   =  .1235E+01  TAU2   = -.1487E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .1019E-01  BK(2,2)= -.1301E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   = -.1542E+01
   R1     =  .6103E+02  R2     =  .5990E+02  RC     =  .5810E+02  T1     =  .7546E+02  T2     =  .7406E+02  TC     =  .7184E+02
   XI7    =  .4463E-07  AA     = 0.          ALPHA  =  .7594E-03  TAU1   =  .1235E+01  TAU2   = -.2220E-05

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .8809E-02  BK(2,2)= -.1054E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1542E+01
   R1     =  .6736E+02  R2     =  .6617E+02  RC     =  .6343E+02  T1     =  .8327E+02  T2     =  .8181E+02  TC     =  .7863E+02
   XI7    =  .3747E-07  AA     = 0.          ALPHA  =  .3438E-03  TAU1   =  .1235E+01  TAU2   = -.6764E-06

JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
   BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .9196E-02  BK(2,2)= -.1119E-01  BK(1,3)= 0.          BK(2,3)= 0.
   THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   = -.1542E+01
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
X17   =  .3941E-07  AA    = 0.          ALPHA  =  .4604E-03  TAU1   =  .1235E+01  TAU2   = -.1048E-05


JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .8143E-02  BK(2,2)= -.9949E-02  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1542E+01
  R1     =  .8175E+02  R2     =  .8054E+0.  RC     =  .7716E+02  T1     =  .1011E+03  T2     =  .9957E+02  TC     =  .9540E+02
  X17    =  .3423E-07  AA     = 0.          ALPHA  =  .1634E-03  TAU1   =  .1235E+01  TAU2   = -.2216E-06


JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .8446E-02  BK(2,2)= -.9967E-02  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   = -.1543E+01
  R1     =  .8983E+02  R2     =  .8862E+02  RC     =  .8556E+02  T1     =  .1111E+03  T2     =  .1096E+03  TC     =  .1054E+03
  X17    =  .3569E-07  AA     = 0.          ALPHA  =  .2564E-03  TAU1   =  .1235E+01  TAU2   = -.4357E-06


JFAM=2   IFAM(FAMILY TYPE)=2   K(NO. OF POINTS IN FAMILY)=  3   NBB= 0   ISURF=0   MNXFLG(MIN OR MAX CAUSTIC)=0
  BK(1,1)= 0.          BK(2,1)= 0.          BK(1,2)=  .7609E-02  BK(2,2)= -.8716E-02  BK(1,3)= 0.          BK(2,3)= 0.
  THR1   = 0.          THR2   = 0.          THRC   = 0.          THS1   = 0.          THS2   = 0.          THSC   =  .1542E+01
  R1     =  .9615E+02  R2     =  .9490E+02  RC     =  .9089E+02  T1     =  .1189E+03  T2     =  .1173E+03  TC     =  .1124E+03
  X17    =  .3171E-07  AA     = 0.          ALPHA  =  .6736E-04  TAU1   =  .1235E+01  TAU2   =  .5866E-07
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

```
                    --- MPP-PARTS ENTERED ---
MPP NORDA BENCHMARK RUN.
    NRTL  =  100.NTLL  =      1.00.DRTL  =      1.00
      IFOM        ISII
        1          0
        1          1
    NUMFRQ( 1)=    1
    FREQR =     50.00
    NUMFRQ( 2)=    2
    FREQR =     35.00    100.00
```

FIGURE 2: EXPECTED MPP OUTPUT (continued)

MPP NORDA BENCHMARK RUN.

TRANSMISSION LOSS VERSUS RANGE

RECEIVER DEPTH = 40.00 FT SOURCE DEPTH = 300.00 FT AT FREQUENCY OF 50.0 HZ UNDER OPTIONS - IPC = 1 IFCOH = 1 ISII = 0

TRANSMISSION LOSS (DB RE 1 YD)

RANGE (NM)										
1.00	63.4	71.5	82.0	83.1	83.9	84.4	84.7	84.7	84.5	84.0
11.00	83.3	82.7	79.7	82.2	78.8	80.0	81.4	82.0	82.7	83.1
21.00	83.8	83.9	84.2	84.5	84.8	85.5	85.9	82.7	80.9	84.8
31.00	84.0	84.8	85.7	86.3	86.8	87.1	87.5	87.8	88.0	88.2
41.00	88.8	89.1	89.7	78.1	83.6	87.7	86.2	86.9	87.4	87.8
51.00	88.1	88.5	88.8	89.0	89.4	89.6	89.9	90.3	85.9	85.7
61.00	87.5	87.9	88.2	89.2	89.6	89.9	90.2	90.5	91.0	91.3
71.00	91.5	91.9	92.1	92.3	89.5	88.7	89.8	89.0	89.8	90.3
81.00	90.7	90.9	91.1	91.4	91.6	91.8	92.1	92.4	92.5	93.7
91.00	89.9	90.7	90.6	90.5	91.3	93.7	88.7	92.0	94.9	94.0

FIGURE 2: EXPECTED MPP OUTPUT (continued)

MPP NURDA BENCHMARK RUN.

TRANSMISSION LOSS VERSUS RANGE

RECEIVER DEPTH = 60.00 FT SOURCE DEPTH = 1000.00 FT AT FREQUENCY OF 35.0 HZ UNDER OPTIONS - IPC = 1 IFCOH = 1 ISEE = 1

RANGE (NM)	TRANSMISSION LOSS (DB RE 1 YD)									
1.00	62.7	67.7	70.0	70.7	80.5	80.9	81.2	81.4	81.6	83.6
11.00	75.8	80.0	82.4	84.0	84.3	83.9	76.6	82.4	82.3	82.7
21.00	83.6	84.4	85.6	87.0	87.6	80.2	79.1	83.5	85.8	86.1
31.00	79.3	85.0	89.5	89.3	88.6	86.8	86.6	86.7	86.6	86.4
41.00	86.4	70.4	77.9	83.8	80.7	88.5	90.4	91.5	92.2	92.7
51.00	92.9	93.6	93.8	93.2	92.5	91.3	78.4	78.2	82.4	85.7
61.00	87.4	87.9	89.8	90.3	90.7	91.0	91.6	92.0	92.3	92.6
71.00	93.4	94.3	84.4	85.7	88.3	90.5	91.9	92.5	92.8	92.9
81.00	93.1	93.1	93.0	92.8	92.7	92.5	92.5	85.3	84.1	86.1
91.00	87.9	89.3	90.5	91.9	95.4	95.6	101.1	100.0	86.0	150.0

FIGURE 2: EXPECTED MPP OUTPUT (continued)

MPP NORDA BENCHMARK RUN.

TRANSMISSION LOSS VERSUS RANGE

RECEIVER DEPTH = 60.00 FT SOURCE DEPTH = 1000.00 FT AT FREQUENCY OF 100.0 HZ UNDER OPTIONS - IPC = 1 IFCOM = 1 ISII = 1

TRANSMISSION LOSS (DB RE 1 YD)

RANGE (NM)										
1.00	62.8	67.9	70.2	70.9	81.9	82.0	81.8	81.4	81.0	83.5
11.00	77.1	78.2	81.8	83.9	84.6	83.8	76.3	82.1	82.7	84.2
21.00	85.3	85.5	85.6	86.4	85.1	80.8	79.1	81.8	83.9	85.4
31.00	79.1	84.1	86.8	86.1	85.3	84.6	85.3	86.5	87.3	87.9
41.00	88.4	72.8	78.6	83.5	85.9	87.4	88.2	88.6	88.6	88.4
51.00	87.7	88.0	88.3	88.3	88.2	87.9	78.3	79.5	82.7	85.7
61.00	87.9	89.1	90.2	90.8	91.3	91.8	92.5	93.0	93.0	92.7
71.00	92.4	92.1	85.5	85.5	86.9	88.0	88.5	88.7	89.5	90.3
81.00	91.2	92.1	92.8	93.5	94.2	94.9	95.1	87.8	86.3	87.5
91.00	88.7	89.8	90.8	92.7	96.1	95.9	97.6	97.2	86.0	150.0

--- MPP-PARTS NORMALLY TERMINATED ---

FIGURE 2: EXPECTED MPP OUTPUT (continued)

II.7 Site Dependent Software

MPP contains FORTRAN code which may be site dependent. This code is in the form of subroutine calls to system routines that are not included in the PL provided in this package. Most of these calls involve the FORTRAN interface with the Record Manager at DTNSRDC and are used in defining and referencing direct access mass storage files. It is possible that these subroutines may have different names and/or argument lists at the bench mark site. Table IV lists candidate site dependent subroutines and the exact location in MPP at which each subroutine call is generated.

The user should reference Table IV and determine if any candidate subroutines are inappropriate at the bench mark site. For each site dependent subroutine found, the following course of action is recommended to modify the execution deck:

1. Determine the appropriate subroutine call and argument list to perform the desired function at the bench mark site. (Table III, page I-7, lists the purpose of each subroutine call).

2. Prepare the necessary update cards to delete the existing call statement and replace it with the proper call. Certify that names given to variables in the updates are consistent with existing names. To assist the user in this, Sections II.7.1 through II.7.6 reproduce each subroutine call exactly as it appears in the FORTRAN compilation listing. Each argument in the call list is discussed. Additionally, Appendix D contains the complete compilation listing of each program element (main program, subroutine, etc.) that references a possible site dependent subroutine, and Appendix C contains user level documentation for each possible site dependent subroutine.

3. Insert update cards in the MPP execution deck. For every PL on the program tape accessed by UPDATE there is a "7/8/9" card in the execution deck to satisfy the UPDATE command. Each of these "7/8/9" cards is annotated with the name of a PL. Insert the update cards immediately following the "7/8/9" card with the name of the PL which contains the site dependent feature being modified.

TABLE IV: LOCATION OF POSSIBLE SITE DEPENDENT SOFTWARE IN MPP

Possible Site Dependent Subroutine	PL or Program Name	Program Element	Line No.	Line ID
CLOSEM	MPP2	SUBROUTINE CTL2	1369	15AUG78.110
			1374	15AUG78.115
	MPP3	PROGRAM MAIN	170	15AUG78.46
DATE	MPP5	SUBROUTINE CTL3	324	17JAN75.10
FILEDA	MPP2	SUBROUTINE CTL2	151	15AUG78.59
			166	15AUG78.70
	MPP3	PROGRAM MAIN	139	15AUG78.37
GET	MPP2	SUBROUTINE CTL2	269	15AUG78.79
	MPP3	SUBROUTINE GETARV	17	15AUG78.115
OPENM	MPP2	SUBROUTINE CTL2	154	15AUG78.62
			169	15AUG78.73
	MPP3	PROGRAM MAIN	142	15AUG78.40
PUT	MPP2	SUBROUTINE CTL2	1327	15AUG78.101

II.7.1 CLOSEM references

FORTRAN Statement: Line ID:

```
      CALL CLOSEM (NEWFIT)                                    15AUG78  110
```

Argument List:

NEWFIT -- A 35-word typeless array used as a File Information Table defined in a prior call to FILEDA.

FORTRAN Statement: Line ID:

```
      IF (INTAPE .GT. 0) CALL CLOSEM (OLDFIT)                 15AUG78  115
```

Argument List:

OLDFIT -- A 35-word typeless array used as a File Information Table defined in a prior call to FILEDA.

FORTRAN Statement: Line ID:

```
      CALL CLOSEM (ARVFIT)                                    15AUG78   46
```

Argument List:

ARVFIT -- A 35-word typeless array used as a File Information Table defined in a prior call to FILEDA. Located in COMMON ARVDA.

II.7.2 DATE references

FORTRAN Statement: Line ID:

```
      CALL DATE (IDATE)                                       17JAN75   10
```

Argument List:

IDATE -- Current date returned by DATE in the form 10Hbmm/dd/yybb (b represents a blank character).

II.7.3 FILEDA references

FORTRAN Statement: Line ID:

```
      CALL FILEDA(OLDFIT,3LLFN,6LGRPAR2,2LFO,2LDA,2LRT,1LF,3LMRL,70,  15AUG78  59
     *     3LMNR,70,2LRB,500,3LHMB,100,2LKL,10,2LKT,1LI)              15AUG78  60
```

Argument List:

OLDFIT	—	A 35-word typeless array used as a File Information Table and defined by FILEDA.
3LLFN	—	Informs FILEDA that next argument defines logical file name.
6LGRPAR2	—	Logical file name is GRPAR2.
2LFO	—	Next argument defines file organization.
2LDA	—	File organization is direct access.
2LRT	—	Next argument defines record type.
1LF	—	Record type is fixed length.
3LMRL	—	Next argument is maximum record length.
70	—	Maximum record length is 70 characters.
3LMNR	—	Next argument is minimum record length.
70	—	Minimum record length is 70 characters.
2LRB	—	Next argument is number of records per block.
500	—	Number of records per block is 500.
3LHMB	—	Next argument is number of home blocks.
100	—	Number of home blocks is 100.
2LKL	—	Next argument is key length.
10	—	Key length is 10 characters.
2LKT	—	Next argument is key type.
1LI	—	Key type is integer.

Note: According to the Record Manager documentation, key type does not apply to direct access files. Apparently it has no effect on FILEDA.

FORTRAN Statement: Line ID:

```
CALL FILEDA(NEWFIT,3LLFN,6LGRPARV,2LFO,2LDA,2LRT,1LF,3LMRL,70,    15AUG78  70
3LMNR,70,2LRB,500,3LHMB,100,2LKL,10,2LKT,1LI)                     15AUG78  71
```

Argument List:

NEWFIT — A 35-word typeless array used as a File Information Table and defined by FILEDA.

3LLFN — Informs FILEDA that next argument defines logical file name.

6LGRPARV — Logical file name is GRPARV.

Note: All remaining arguments are identical to those discussed above for FILEDA reference at Line ID 15 AUG 78.59.

FORTRAN Statement: Line ID:

```
      CALL FILEDA(ARVFIT,3LLFN,6LGRPARV,2LFO,2LDA,2LRT,1LF,3LMRL,70,    15AUG78  37
     *            3LMNR,70,2LRB,500,3LHMB,100,2LKL,10,2LKT,1LI)          15AUG78  38
```

Argument List:

ARVFIT — A 35-word typeless array used as a File Information Table and defined by FILEDA. It is in COMMON ARVDA.

3LLFN — Informs FILEDA that next argument defines logical file name.

6LGRPARV — Logical file name is GRPARV.

Note: All remaining arguments are identical to those discussed above for FILEDA reference at Line ID 15AUG78.59.

II.7.4 GET references

FORTRAN Statement: Line ID:

CALL GET (OLDFIT, ARVRE2, KEYOLD, 0) 15AUG78 79

Argument List:

OLDFIT — A 35-word typeless array used as a File Information

ARVRE2 — A 7-word real array into which data is to be transferred. Output from GET.

KEYOLD — Integer key for access to record. Input to GET.

0 — Character position within KEYOLD that key begins. Input to GET.

FORTRAN Statement: Line ID:

CALL GET(ARVFIT,ARVREC,IARVK,0) 15AUG78 115

Argument List:

ARVFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA. It is in COMMON ARVDA.

ARVREC — A 7-word real array into which data is to be transferred. Output from GET.

IARVK — Integer key for access to record. Input to GET.

0 — Character position within IARVK that key begins. Input to GET.

II.7.5 OPENM references

FORTRAN Statement: Line ID:

CALL OPENM (OLDFIT, 5LINPUT) 15AUG78 62

Argument List:

OLDFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

5LINPUT — Open file as read only file.

FORTRAN Statement: Line ID:

CALL OPENM (NEWFIT, 3LNEW) 15AUG78 73

Argument List:

NEWFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

3LNEW — Open file for purpose of creation.

FORTRAN Statement: Line ID:

CALL OPENM (ARVFIT, 5LINPUT) 15AUG78 40

Argument List:

ARVFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA. It is in COMMON ARVDA.

3LINPUT — Open the file as a read only file.

II.7.6 PUT references

FORTRAN Statement:	Line ID:
CALL PUT (NEWFIT, ARVREC)	15AUG78 101

Argument List:

NEWFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

ARVREC — A 7-word real array from which data is to be transferred. Input to PUT.

III. AUTO-OCEAN

III.1 General Information

AUTO-OCEAN is a batch mode program consisting of a single executable module referenced as AUTOOC in the execution deck. It is preceded by two small utility programs which generate data bases needed by AUTO-OCEAN. The program is coded in FORTRAN IV except for the integer function FIELD which is a COMPASS coded routine contained in the AUTO-OCEAN PL on the program tape. If the FORTRAN compiler at the bench mark site cannot accept a COMPASS routine intermingled with FORTRAN subroutines, the following modifications should be made to the execution deck:

1. Remove FIELD from the AUTOOC PL with the UPDATE directive "*YANKDECK FIELD."

2. Punch function FIELD from its symbolic listing presented in Appendix B.

3. Insert the punched cards and necessary job stream instructions to assemble FIELD separately and include it when loading AUTOOC.

III.2 Location of Program

The PL for AUTO-OCEAN is the 7th PL (7th binary record) on program tape CK0713 and backup program tape CK0720. The two utility programs exist as FORTRAN punched card decks within the AUTO-OCEAN execution deck.

III.3 Job Stream

The job stream included in the AUTO-OCEAN execution deck and listed in Section III.5 with comments performs the following basic functions: mounts backup data tape CK0932, compiles and executes utility programs BSCRAM and PSCRAM from cards to create scratch mass storage data base files, mounts backup program tape CK0720, updates from the PL on the program tape, compiles, then loads and executes AUTOOC twice. The first execution is long and generates much listable output which is written to the dummy file OUT. The second execution is shorter and generates a more manageable output which is printed (see Section III.6). Job stream commands shown are those used on the DTNSRDC CDC 6600/6700 system. They may require modification at the bench mark site.

III.4 Input

AUTO-OCEAN uses two external data bases referred to as BATHY and PROFILES. Both files exist as permanent cataloged mass storage files on the CDC 6600/6700 system at DTNSRDC, but for the purpose of executing at the bench mark site they are generated from tape as temporary files on mass storage by two utility programs within the execution deck. Program BSCRAM creates the direct access file BATHY; program PSCRAM creates the random access file PROFILES. AUTO-OCEAN also requires card input which is included in the execution deck. BSCRAM and PSCRAM require no cards. All necessary data cards are contained in the AUTO-OCEAN execution deck and are listed in Section III.5.

III.5 Execution Deck

A listing of the AUTO-OCEAN execution deck is presented in Figure 3 followed by comments. Numbers opposite card images in the figure coincide with the appropriate comment number. Job stream commands and data are identical to those which produced the output in Section III.6 on the CDC 6600/6700 system at DTNSRDC.

Comment Number:	Card Image:

```
  1 - VSN,TAPEA=CK0932,OLDPL=CK0720.
  2 - REQUEST,TAPEA,HY,NORING.     /CK0932/NORING/
  3 - COPYBF,TAPEA,TAPE50.
  4 - FTN,R=3,B=BSCRAM.
  5 - BSCRAM.
  6 - RETURN,BSCRAM.
  7 - COPYBF,TAPEA,TAPE51.
  8 - UNLOAD,TAPEA.
  9 - FTN,R=3,B=PSCRAM.
 10 - PSCRAM.
  6 - RETURN,PSCRAM.
 11 - REQUEST,OLDPL,HY,NORING.      /CK0720/NORING/
 12 - COPYBR,OLDPL,DUM,6.
  6 - RETURN,DUM.
 13 - UPDATE,F,R,C=COMPILE.
 14 - UNLOAD,OLDPL.
 15 - REWIND,COMPILE.
 16 - FTN,I=COMPILE,L=0,OPT=2,B=AUTOOC.
  6 - RETURN,COMPILE.
 17 - AUTOOC,,OUT.
 18 - AUTOOC.
*19 - 7/8/9 END OF RECORD CARD
 20 -        PROGRAM BSCRAM(OUTPUT,TAPE50,TAPE51,TAPE8)
 20 -         DIMENSION KEY(289),DAT1(640),DAFIT(35),DAT2(541)
 20 - C                    ENVIRONMENT FILE TO RANDOM(DA) FORMAT
 20 -         REWIND 50
 20 -         CALL FILEDA(DAFIT,3LLFN,5LBATHY,2LFO,2LDA,2LRT,1LF,3LMRL,5410,
 20 -        * 3LMNP,5410,2LKL,10,3LHMB,20,3LMBL,27250)
 20 -         CALL OPENM(DAFIT,3LNEW)
 20 -         DO 20 I=1,48
 20 -         AKEY=I
 20 -         READ(50) DAT2
 20 -         CALL PUT(DAFIT,DAT2)
 20 - 20      CONTINUE
 20 -         END
*21 - 7/8/9 END OF RECORD CARD
 22 -        PROGRAM PSCRAM(OUTPUT,TAPE50,TAPE51,TAPE8,TAPE6=OUTPUT)
 22 - C
 22 - C           THIS PROGRAM CONVERTS A SEQUENTIAL AUTO-OCEAN PROFILE FILE
 22 - C           TO A RANDOM FILE FOR USE BY AUTO-OCEAN.
 22 - C
 22 -         DIMENSION KEY(289),DAT1(640),DAT2(541),DAFIT(35)
 22 -         REWIND 51
 22 -         CALL OPENMS(8,KEY,289,0)
 22 -         DO 10 I=1,288
 22 -           READ(51) DAT1
 22 -           CALL WRITMS(8,DAT1,640,I,-1,0)
 22 -  10     CONTINUE
 22 -         END
*23 - 7/8/9 END OF RECORD CARD
```

FIGURE 3: AUTO-OCEAN EXECUTION DECK

```
Comment
Number:                                                    Card
                                                           Image:
* 24 - 7/8/9 END OF RECORD CARD
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 1
  25 - 10.0      N150.0     E30.        3000.          WINTER
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 2
  25 - 50.0      N160.0     E135.0      3000.          SPRING
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 3
  25 - 10.0      N180.0     W325.0      3000.          SUMMER
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 4
  25 - 50.0      N175.0     W225.0      3000.          FALL
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 5
  25 - 10.0      N155.0     W5.0        3000.          WINTER
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 6
  25 - 50.0      N150.0     W160.0      3000.          SPRING
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 7
  25 - 30.0      N70.0      W50.0       3000.          SUMMER
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 8
  25 - 20.0      N60.0      W45.0       3000.          FALL
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 9
  25 - 10.0      N55.0      W55.0       3000.          WINTER
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 10
  25 - 40.0      N60.0      W135.0      3000.          SPRING
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 11
  25 - 60.0      N15.0      W210.0      3000.          SUMMER
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 12
  25 - 34.0      N33.0      E275.       3000.          FALL
  25 - AUTO-OCEAN NORDA BENCHMARK TRACK 13
  25 - 0.0       N50.0      E20.0       3000.          WINTER
* 26 - 7/8/9 END OF RECORD CARD
  27 - AUTO-OCEAN NORDA BENCHMARK TRACK A
  27 - 10.0      N30.0      W345.0      3000.          SUMMER
**28 - 6/7/8/9 END OF JOB CARD
```

* This image represents a card with a 7/8/9 multi-punch in Col. 1.

** This image represents a card with a 6/7/8/9 multi-punch in Col. 1.

FIGURE 3: AUTO-OCEAN EXECUTION DECK (continued)

The following comments refer to card images in the AUTO-OCEAN execution deck listed in Figure 3.

Comment Number:	Comment:
1	Specify data and program tapes to be used.
2	Mount unlabeled data tape with local file name TAPEA. Density = 800 BPI (HY). No write ring.
3	Copy 1st file to scratch file TAPE50 for input to program BSCRAM.
4	Create the binary file BSCRAM from FORTRAN punched card deck.
5	Load and execute BSCRAM. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
6	This is done to minimize mass storage usage.
7	Copy 2nd file to scratch file TAPE51 for input to program PSCRAM.
8	Data tape no longer needed.
9	Create the binary file PSCRAM from FORTRAN punched card deck.
10	Load and execute PSCRAM. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
11	Mount unlabeled program tape with local file name OLDPL. Density = 800 BPI (HY). No write ring.
12	Position program tape before the 7th PL, i.e., the 7th binary record.
13	Create compile file from 7th PL on tape.
14	Program tape no longer needed.
15	This card is needed because UPDATE R option inhibits automatic rewind.
16	Create the binary file AUTOOC.
17	Load and execute AUTOOC. Send listable output to dummy file OUT. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.

Comment Number:	*Comment:*
18	Load and execute AUTOOC. Print listable output. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
19	Program BSCRAM follows this card.
20	BSCRAM FORTRAN program cards.
21	Program PSCRAM follows this card.
22	PSCRAM FORTRAN program cards.
23	Updates to AUTOOC, if any, follow this card. Updates may be necessary to modify site dependent coding.
24	Data for AUTOOC (1st execution) follow this card.
25	AUTOOC data cards (1st execution).
26	Data for AUTOOC (2nd execution) follow this card.
27	AUTOOC data cards (2nd execution).
28	End of deck.

III.6 Output

The expected output from running the AUTO-OCEAN execution deck is listed in Figure 4.

```
AUTO-OCEAN NOWDA BENCHMARK TRACK A


START NEW CASE. LATITUDE IS IN THE RANGE 0.0 TO
90.0 WITH A HEMISPHERE DESIGNATOR (N OR S).
LONGITUDE IS IN THE RANGE 0.0 TO 180.0 WITH A
HEMISPHERE DESIGNATOR (E OR W). BEARING IS GIVEN
IN DEGREES CLOCKWISE WITH RESPECT TO DUE NORTH.
SEASON IS WINTER,SPRING,SUMMER,FALL. MAXIMUM
RANGE IS GIVEN IN NAUTICAL MILES.


LATITUDE      =     10.00N
LONGITUDE     =     30.00W
BEARING       =    345.00 DEGREES
MAX RANGE     =   3000.00 NAUTICAL MILES
SEASON        =    SUMMER

(NO PROFILES WILL BE PUNCHED)

PROFILE IDENTIFICATION ... MSQ,MSQS =  40   1          SOURCE ... N ATL PROFILES MSQ 040-SUMMER-1
PROFILE IDENTIFICATION ... MSQ,MSQS =  40   3          SOURCE ... N ATL PROFILES MSQ 040-SUMMER-3
PROFILE IDENTIFICATION ... MSQ,MSQS =  76   1          SOURCE ... N ATL PROFILES MSQ 076-SUMMER-2
PROFILE IDENTIFICATION ... MSQ,MSQS =  76   3          SOURCE ... N ATL PROFILES MSQ 076-SUMMER-3
PROFILE IDENTIFICATION ... MSQ,MSQS =  76   4          SOURCE ... N ATL PROFILES MSQ 076-SUMMER-4
PROFILE IDENTIFICATION ... MSQ,MSQS = 112   2          SOURCE ... N ATL PROFILES MSQ 112-SUMMER-2
PROFILE IDENTIFICATION ... MSQ,MSQS = 112   4          SOURCE ... N ATL PROFILES MSQ 112-SUMMER-4
PROFILE IDENTIFICATION ... MSQ,MSQS = 113   3          SOURCE ... N ATL PROFILES MSQ 113-SUMMER-3
PROFILE IDENTIFICATION ... MSQ,MSQS = 149   1          SOURCE ... N ATL PROFILES     MSQ 149-SUMMER-1
PROFILE IDENTIFICATION ... MSQ,MSQS = 149   3          SOURCE ... N ATL PROFILES     MSQ 149-SUMMER-3
PROFILE IDENTIFICATION ... MSQ,MSQS = 149   4          SOURCE ... N ATL PROFILES     MSQ 149-SUMMER-4
PROFILE IDENTIFICATION ... MSQ,MSQS = 185   2          SOURCE ... N  TL PROFILES MSQ 185-SUMMER-2
PROFILE IDENTIFICATION ... MSQ,MSQS = 185   4          SOURCE ... N ATL PROFILES MSQ 185-SUMMER-4
PROFILE IDENTIFICATION ... MSQ,MSQS = 186   3          SOURCE ... N ATL PROFILES MSQ 186-SUMMER-3
PROFILE IDENTIFICATION ... MSQ,MSQS = 186   3          SOURCE ... N ATL PROFILES MSQ 186-SUMMER-3

ENVIRONMENT ...


NUMBER OF PROFILES = 15

PROFILE NUMBER  1     RANGE =    0.0 NM.        16 POINTS
     0. 1542.0      50. 1532.7      75. 1515.1     100. 1509.8     150. 1498.8     200. 1496.4     300. 1494.4     500. 1492.8
   700. 1488.8     800. 1488.1    1100. 1489.4    1500. 1493.0    2000. 1497.9    3000. 1512.0    5000. 1545.2   10000. 1638.0

PROFILE NUMBER  2     RANGE =  111.0 NM.          16 POINTS
```


FIGURE 4: EXPECTED AUTO-OCEAN OUTPUT

```
[illegible]
      0. 1535.5      30. 1536.1      50. 1535.6      125. 1530.7      200. 1519.4      250. 1514.9      600. 1498.4      800. 1492.8
    900. 1491.3    1500. 1495.3    2000. 1498.0     3000. 1512.0     5000. 1545.2    10000. 1638.0

PROFILE NUMBER  3     RANGE =  622.6 NM.           17 POINTS
      0. 1538.0      30. 1538.4      75. 1530.7      125. 1527.5      200. 1521.2      400. 1513.1      600. 1506.8      800. 1499.7
    900. 1497.0    1000. 1495.6    1100. 1495.2     1400. 1495.8     1750. 1497.4     2000. 1499.4     3000. 1511.9     5000. 1545.6
  10000. 1638.0

PROFILE NUMBER  4     RANGE =  934.9 NM.           14 POINTS
      0. 1534.9      20. 1535.2      75. 1530.1      125. 1525.0      250. 1518.3      400. 1512.5      700. 1504.8     1100. 1498.6
   1300. 1498.6    1750. 1499.4    2000. 1500.7     3000. 1511.9     5000. 1547.0    10000. 1638.0

PROFILE NUMBER  5     RANGE = 1049.9 NM.           16 POINTS
      0. 1536.9      30. 1538.2      50. 1536.9      100. 1528.8      200. 1522.4      400. 1515.4      600. 1509.2      900. 1499.9
   1000. 1497.7    1100. 1496.7    1400. 1496.6     1750. 1497.6     2000. 1499.8     3000. 1511.8     5000. 1547.0    10000. 1638.0

PROFILE NUMBER  6     RANGE = 1248.4 NM.           15 POINTS
      0. 1542.0      30. 1537.1      75. 1524.8      125. 1521.3      200. 1519.7      300. 1520.1      600. 1511.3      800. 1502.5
   1000. 1497.4    1200. 1497.2    1500. 1496.2     2000. 1498.6     2500. 1504.6     5000. 1546.0    10000. 1638.0

PROFILE NUMBER  7     RANGE = 1563.3 NM.           16 POINTS
      0. 1529.3      20. 1525.5      75. 1516.6      100. 1514.1      150. 1512.6      250. 1511.3      500. 1504.0      700. 1501.5
    800. 1501.1    1000. 1496.8    1200. 1494.5     1750. 1496.7     2000. 1498.7     2500. 1505.3     5000. 1546.0    10000. 1638.0

PROFILE NUMBER  8     RANGE = 1864.5 NM.           14 POINTS
      0. 1533.6      30. 1528.1     100. 1517.3      300. 1514.1      500. 1508.0      700. 1497.4      800. 1493.6      900. 1491.3
   1200. 1491.8    1400. 1492.2    1750. 1495.2     2500. 1505.7     5000. 1545.2    10000. 1638.0

PROFILE NUMBER  9     RANGE = 1880.4 NM.           12 POINTS
      0. 1528.4      50. 1511.0     200. 1509.5      400. 1510.8      700. 1495.4      900. 1488.7     1200. 1489.0     1400. 1490.6
   2000. 1497.8    3000. 1513.0    5000. 1545.3    10000. 1638.0

PROFILE NUMBER 10     RANGE = 2200.4 NM.           14 POINTS
      0. 1501.3      50. 1482.8     125. 1477.8      150. 1473.5      250. 1473.5      500. 1478.6      700. 1479.8      800. 1479.2
   1200. 1484.0    1500. 1488.6    2000. 1497.0     3000. 1512.9     5000. 1545.3    10000. 1638.0

PROFILE NUMBER 11     RANGE = 2460.6 NM.           12 POINTS
      0. 1487.3      30. 1485.9      50. 1463.1      125. 1468.4      300. 1471.4      600. 1474.7     1000. 1481.3     1500. 1489.4
   2000. 1497.0    3000. 1513.0    5000. 1545.3    10000. 1638.0

PROFILE NUMBER 12     RANGE = 2524.6 NM.            8 POINTS
      0. 1489.3      50. 1471.9     100. 1468.2      200. 1468.2      600. 1473.9     1100. 1482.7     5000. 1546.0    10000. 1638.0

PROFILE NUMBER 13     RANGE = 2855.4 NM.            6 POINTS
      0. 1480.6     100. 1471.9     300. 1472.3     1200. 1484.4     5000. 1546.0    10000. 1638.0

PROFILE NUMBER 14     RANGE = 2897.3 NM.            7 POINTS
      0. 1483.7      50. 1467.4      75. 1466.3      125. 1466.2     2000. 1497.8     5000. 1546.0    10000. 1638.0

PROFILE NUMBER 15     RANGE = 3039.4 NM.            7 POINTS
      0. 1483.7      50. 1467.4      75. 1466.3      125. 1466.2     2000. 1497.8     5000. 1546.0    10000. 1638.0


NOTE - 1. THE INTEGER VALUES FOR LATITUDE AND LONGITUDE, BELOW, ARE SOUTHEAST CORNERS OF 1-DEGREE SQUARES.
       2. THE FLOATING POINT VALUES FOR LATITUDE AND LONGITUDE, BELOW, ARE INTERSECTIONS OF THE GREAT CIRCLE PATH
          WITH 1-DEGREE SQUARE BOUNDARIES, EXCEPT THE FIRST POINT WHICH BEGINS THE GREAT CIRCLE.

                                                                 0-5          0-9
POINT  LAT  LON  MSQ  MSQS     LAT       LON    RANGE (NM)     B-CLASS      B-CLASS      WAVE-HT (FT)      DEPTH (M)

    1   10  330   40    1     10.00    330.00      0.00           3            6             3.5            5500.0
    2   11  330   40    1     11.00    329.73     62.17           3            5             3.5            5600.0
    3   12  330   40    1     12.00    329.45    124.35           3            5             3.5            5750.0
```

FIGURE 4: EXPECTED AUTO-OCEAN OUTPUT (continued)

5	13	329	40	1	13.63	329.00	225.61	3	6	3.5	6000.0
6	14	329	40	1	14.00	328.90	248.77	2	6	3.5	6300.0
7	15	329	40	3	15.00	328.61	311.01	2	6	4.5	6000.0
8	16	329	40	3	16.00	328.33	373.27	3	6	4.5	5000.0
9	17	329	40	3	17.00	328.04	435.55	3	5	4.5	4900.0
10	17	328	40	3	17.14	328.00	444.50	3	5	4.5	4900.0
11	18	328	40	3	18.00	327.75	497.86	5	5	4.5	4900.0
12	19	328	40	3	19.00	327.46	560.20	5	5	4.5	5100.0
13	20	328	76	1	20.00	327.16	622.56	5	5	4.0	5300.0
14	20	327	76	1	20.53	327.00	655.43	5	5	4.0	5600.0
15	21	327	76	1	21.00	326.86	684.96	5	6	4.0	5650.0
16	22	327	76	1	22.00	326.55	747.39	5	7	4.0	5800.0
17	23	327	76	1	23.00	326.24	809.86	5	7	4.0	6000.0
18	23	326	76	1	23.76	326.00	857.45	5	7	4.0	6100.0
19	24	326	76	1	24.00	325.92	872.36	5	7	4.0	6300.0
20	25	326	76	3	25.00	325.60	934.91	5	7	3.5	6100.0
21	26	326	76	3	26.00	325.28	997.50	5	7	3.5	5700.0
22	26	325	76	4	26.84	325.00	1049.91	5	7	4.5	5400.0
23	27	325	76	4	27.00	324.95	1060.14	5	7	4.5	5400.0
24	28	325	76	4	28.00	324.61	1122.82	5	7	4.5	5000.0
25	29	325	76	4	29.00	324.26	1185.56	5	7	4.5	4500.0
26	29	324	76	4	29.75	324.00	1232.49	5	7	4.5	4300.0
27	30	324	112	2	30.00	323.91	1248.36	5	7	2.5	3900.0
28	31	324	112	2	31.00	323.55	1311.22	5	7	2.5	3900.0
29	32	324	112	2	32.00	323.18	1374.14	5	7	2.5	3400.0
30	32	323	112	2	32.49	323.00	1405.06	5	6	2.5	3300.0
31	33	323	112	2	33.00	322.81	1437.12	5	6	2.5	914.0
32	34	323	112	2	34.00	322.42	1500.18	5	6	2.5	2800.0
33	35	323	112	4	35.00	322.03	1563.32	5	6	3.0	1042.0
34	35	322	112	4	35.07	322.00	1567.73	5	6	3.0	3700.0
35	36	322	112	4	36.00	321.62	1626.54	5	6	3.0	3800.0
36	37	322	112	4	37.00	321.21	1689.85	5	6	3.0	4000.0
37	37	321	112	4	37.49	321.00	1720.76	5	6	3.0	4300.0
38	38	321	112	4	38.00	320.78	1753.26	5	5	3.0	4400.0
39	39	321	112	4	39.00	320.34	1816.76	5	5	3.0	4800.0
40	39	320	113	3	39.75	320.00	1864.50	5	5	3.5	4900.0
41	40	320	149	1	40.00	319.89	1880.38	5	5	4.0	4900.0
42	41	320	149	1	41.00	319.42	1944.11	3	5	4.0	4900.0
43	41	319	149	1	41.87	319.00	1999.41	5	3	4.0	5200.0
44	42	319	149	1	42.00	318.93	2007.96	5	3	4.0	4900.0
45	43	319	149	1	43.00	318.43	2071.95	5	3	4.0	4800.0
46	43	319	149	1	43.84	318.00	2125.95	3	3	4.0	5100.0
47	44	318	149	1	44.00	317.92	2136.08	3	3	4.0	4700.0
48	45	318	149	3	45.00	317.38	2200.37	4	3	4.0	4700.0
49	45	317	149	3	45.69	317.00	2244.66	4	3	4.0	4600.0
50	46	317	149	3	46.00	316.82	2264.83	4	8	4.0	2600.0
51	47	317	149	3	47.00	316.24	2329.47	4	8	4.0	286.0
52	47	316	149	3	47.41	316.00	2356.04	4	4	4.0	51.0
53	48	316	149	3	48.00	315.64	2394.30	4	8	4.0	289.0
54	49	316	149	3	49.00	315.01	2459.35	4	5	4.0	3300.0
55	49	315	149	4	49.02	315.00	2460.60	4	4	4.0	3000.0
56	50	315	185	2	50.00	314.36	2524.63	4	8	5.5	3250.0
57	50	314	185	2	50.52	314.00	2558.82	4	8	5.5	2700.0
58	51	314	185	2	51.00	313.67	2590.17	4	3	5.5	3200.0
59	51	313	185	2	51.93	313.00	2651.19	4	4	5.5	3000.0
60	52	313	185	2	52.00	312.95	2655.98	3	3	5.5	3500.0
61	53	313	185	2	53.00	312.19	2722.10	3	3	5.5	3550.0
62	53	312	185	2	53.24	312.00	2738.12	3	3	5.5	3400.0
63	54	312	185	2	54.00	311.39	2788.55	3	3	5.5	3300.0
64	54	311	185	2	54.47	311.00	2820.05	3	4	5.5	3100.0
65	55	311	185	4	55.00	310.55	2855.38	3	4	6.0	3300.0
66	55	310	186	3	55.62	310.00	2897.34	3	3	4.5	3300.0
67	56	310	186	3	56.00	309.66	2922.61	3	3	4.5	3600.0
68	56	309	186	3	56.71	309.00	2970.35	3	3	4.5	3400.0
69	57	309	186	3	57.00	308.72	2990.31	3	3	4.5	3650.0
70	57	308	186	3	57.72	308.00	3039.41	3	3	4.5	3500.0

FIGURE 4: EXPECTED AUTO-OCEAN OUTPUT (continued)

III.7 Site Dependent Software

AUTO-OCEAN and its two utility programs contain FORTRAN code which may be site dependent. This code is in the form of subroutine calls to system routines that are not included in the PL provided in this package. These calls involve the FORTRAN interface with the Record Manager at DTNSRDC and are used in defining and referencing direct access and random access (word addressable) mass storage files. It is possible that these subroutines may have different names and/or argument lists at the bench mark site. Table V lists candidate site dependent subroutines and the exact location in AUTO-OCEAN at which each subroutine call is generated.

The user should reference Table V and determine if any candidate subroutines are inappropriate at the bench mark site. For each site dependent subroutine found, the following course of action is recommended to modify the execution deck:

1. Determine the appropriate subroutine call and argument list to perform the desired function at the bench mark site. (Table III, page I-7, lists the purpose of each subroutine call).

2. Prepare the necessary update cards to delete the existing call statements and replace it with the proper call. Certify that names given to variables in the update are consistent with existing names. To assist the user in this, Sections III.7.1 through III.7.6 reproduce each subroutine call exactly as it appears in the FORTRAN compilation listing. Each argument in the call list is discussed. Additionally, Appendix E contains the complete compilation listing of each program element (main program, subroutine, etc.) that references a possible site dependent subroutine, and Appendix C contains user level documentation for each possible site dependent subroutine.

3. Insert update cards in the AUTO-OCEAN execution deck. For every PL on the program tape accessed by UPDATE there is a "7/8/9" card in the execution deck to satisfy the UPDATE command. Each of these "7/8/9" cards is annotated with the name of a PL. Insert the update cards immediately following the "7/8/9" card with the name of the PL which contains the site dependent feature being modified. For changes to BSCRAM and PSCRAM, simply replace the existing FORTRAN cards in the execution deck with the appropriate new cards.

TABLE V: LOCATION OF POSSIBLE SITE DEPENDENT SOFTWARE IN AUTO-OCEAN

Possible Site Dependent Subroutine	PL or Program Name	Program Element	Line No.	Line ID
FILEDA	BSCRAM	PROGRAM BSCRAM	5	NA*
	AUTOOC	SUBROUTINE LOOKUP	18	AUTOC.324
GET	AUTOOC	SUBROUTINE LOOKUP	28	AUTOC.334
			39	AUTOC.345
OPENM	BSCRAM	PROGRAM BSCRAM	7	NA*
	AUTOOC	SUBROUTINE LOOKUP	20	AUTOC.326
OPENMS	PSCRAM	PROGRAM PSCRAM	8	NA*
	AUTOOC	SUBROUTINE RETREV	10	AUTOC.400
PUT	BSCRAM	PROGRAM BSCRAM	11	NA*
READMS	AUTOOC	SUBROUTINE RETREV	29	AUTOC.419
WRITMS	PSCRAM	PROGRAM PSCRAM	11	NA*

* Not applicable. Line ID's are generated by UPDATE. Since these lines of code exist on cards only, they have no Line ID.

III.7.1 FILEDA references

FORTRAN Statement: (from PROGRAM BSCRAM, Line Nos. 5 & 6)

```
      CALL FILEDA(DAFIT,3LLFN,5LBATHY,2LFO,2LDA,2LRT,1LF,3LMRL,5410,
     *3LMNR,5410,2LKL,10,3LHMB,20,3LMBL,27250)
```

Argument List:

DAFIT	—	A 35-word typeless array used as a File Information Table and defined by FILEDA.
3LLFN	—	Informs FILEDA that next argument defines logical file name.
5LBATHY	--	Logical file name is BATHY.
2LFO	--	Next argument defines file organization.
2LDA	--	File organization is direct access.
2LRT	--	Next argument defines record type.
1LF	--	Record type is fixed length.
3LMRL	—	Next argument is maximum record length.
5410	--	Maximum record length is 5410 characters.
3LMNR	--	Next argument is minimum record length.
5410	--	Minimum record length is 5410 characters.
2LKL	—	Next argument is key length.
10	--	Key length is 10 characters.
3LHMB	--	Next argument is number of home blocks.
20	--	Number of home blocks is 20.
3LMBL	—	Next argument is home block length.
27250	--	Home block length is 27250 characters.

FORTRAN Statement: Line ID:

```
      CALL FILEDA(DAFIT,3LLFN,5LBATHY,2LFO,2LDA,2LRT,1LF,3LMRL,5410,  AUTOC  324
     X 3LMNR,5410,2LKL,10,3LHMB,20,3LMBL,27250)                       AUTOC  325
```

Argument List:

Note: All arguments are identical to those discussed above for FILEDA reference at lines 5 and 6 of PROGRAM BSCRAM.

III.7.2 GET references

FORTRAN Statement: Line ID:

CALL GET (DAFIT, D1, EKEY, 0) AUTOC 334

Argument List:

DAFIT -- A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

D1 -- A 541-word real array into which data is to be transferred. Output from GET.

EKEY -- Real key for access to record. Input to GET.

0 -- Character position within EKEY that key begins. Input to GET.

FORTRAN Statement: Line ID:

CALL GET (DAFIT, D2, WKEY, 0) AUTOC 345

Argument List:

DAFIT -- A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

D2 -- A 541-word real array into which data is to be transferred. Output from GET.

WKEY -- Real key for access to record. Input to GET.

0 -- Character position within WKEY that key begins. Input to GET.

III.7.3 OPENM references

FORTRAN Statement: (from PROGRAM BSCRAM, Line No. 7)

CALL OPENM (DAFIT, 3LNEW)

Argument list:

DAFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

3LNEW — Open file for purpose of creation.

FORTRAN Statement: Line ID:

CALL OPENM (DAFIT, 5LINPUT) AUTOC 326

Argument List:

DAFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

5LINPUT -- Open file as read only file.

III.7.4 OPENMS references

FORTRAN Statement: (from PROGRAM PSCRAM, Line No. 8)

CALL OPENMS (8, KEY, 289, 0)

Argument List:

8 -- File unit designator. Input to OPENMS.

KEY — A 289-word integer array to contain master index. Input to OPENMS.

289 -- Length of master index is 289 words. Input to OPENMS.

0 -- File is to have number type master index. Input to OPENMS.

FORTRAN Statement: Line ID:

IF (.NOT.OPEN) CALL OPENMS (NUNIT, KEY, 289, 0) AUTOC 400

Argument List:

NUNIT -- Integer file unit designator. Input to OPENMS.

KEY — A 289-word integer array to contain master index. Input to OPENMS.

289 — Length of master index is 289 words. Input to OPENMS.

0 — File is to have number type master index. Input to OPENMS.

III.7.5 PUT references

FORTRAN Statement: (from PROGRAM BSCRAM, Line No. 11)

CALL PUT (DAFIT, DAT2)

Argument List:

DAFIT — A 35-word typeless array used as a File Information Table and defined in a prior call to FILEDA.

DAT2 — A 541-word real array from which data is to be transferred. Input to PUT.

III.7.6 READMS references

FORTRAN Statement:	Line ID:	
IF(IBD.NE.IBIN) CALL READMS (NUNIT, DATA, 640, IBD)	AUTOC	419

Argument List:

NUNIT — Integer file unit designator. Input to READMS.

DATA — A 640-word real array into which data is to be transferred. Output from READMS.

640 — Number of words to be transferred. Input to READMS.

IBD — Integer number key for access to record. Input to READMS.

III.7.7 WRITMS references

FORTRAN Statement: (from PROGRAM PSCRAM, Line No. 11)

CALL WRITMS (8, DAT1, 640, I, -1,0)

Argument List:

8 — File unit designator. Input to WRITMS.

DAT1 — A 640-word real array from which data is to be transferred. Input to WRITMS.

640 — Number of words to be transferred. Input to WRITMS.

I -- Integer number key for access to record. Input to WRITMS.

-I -- Rewrite in place if new record length does not exceed old record length, otherwise write at end of information. Input to WRITMS.

0 -- No sub-index marker flag. Input to WRITMS.

IV. NEWPE

IV.1 General Information

NEWPE is a batch mode program consisting of a single executable module referenced as NEWPE in the execution deck. It must be preceded by the executable module INFACE. Communication between INFACE and NEWPE is achieved using a scratch mass storage file which is allocated automatically by the operating system. Both programs are coded entirely in FORTRAN IV.

IV.2 Location of Program

The components of INFACE are PL numbers 8 and 9 (binary records 8 and 9) on program tape CK0713 and backup program tape CK0720. NEWPE is the 10th PL (10th binary record) on the program tape and the backup program tape.

IV.3 Job Stream

The job stream included in the NEWPE execution deck and listed in Section IV.5 with comments performs the following basic functions: mounts program tape CK0713, updates from PL's on program tape, compiles, loads and executes INFACE first, then NEWPE. Job stream commands shown are those used on the DTNSRDC CDC 6600/6700 system. They may require modification at the bench mark site.

IV.4 Input

NEWPE requires no external data bases in the bench mark package. It is driven by data cards, as is INFACE which is executed immediately before NEWPE. NEWPE also reads a scratch mass storage file created by INFACE. All necessary data cards are contained in the NEWPE execution deck and are listed in Section IV.5.

IV.5 Execution Deck

A listing of the NEWPE execution deck is presented in Figure 5 followed by comments. Numbers opposite card images in the figure coincide with the appropriate comment number. Job stream commands and data are identical to those which produced the output in Section IV.6 on the CDC 6600/6700 system at DTNSRDC.

Comment Number: | Card Image

```
  1 - VSN,OLDPL=CK0713.
  2 - REQUEST,OLDPL,HY,NORING.     /CK0713/NORING/
  3 - COPYBR,OLDPL,DUM,7.
  4 - RETURN,DUM.
  5 - UPDATE,F,P,C=COMPILE.
  6 - REWIND,COMPILE.
  7 - FTN,I=COMPILE,L=0,OPT=2,B=INFACE.
  4 - RETURN,COMPILE.
  8 - UPDATE,F,P,C=COMPILE.
  6 - REWIND,COMPILE.
  9 - FTN,I=COMPILE,L=0,OPT=2,B=AUTOCF.
  4 - RETURN,COMPILE.
 10 - LOAD,AUTOCF.
 11 - INFACE.
  4 - RETURN,AUTOCF,INFACE.
 12 - UPDATE,F,P,C=COMPILE.
 13 - UNLOAD,OLDPL.
  6 - REWIND,COMPILE.
 14 - FTN,I=COMPILE,L=0,OPT=2,B=NEWPE.
  4 - RETURN,COMPILE.
 15 - NEWPE.
* 16 - 7/8/9 END OF RECORD CARD
* 17 - 7/8/9 END OF RECORD CARD
* 18 - 7/8/9 END OF RECORD CARD
 19 -      0    0    0    1
 19 - 0.0          14    1    0     0.0
 19 - 0000.     1540.9     0075.    1541.8    0125.    1539.6    0200.    1528.0
 19 - 0400.     1497.5     0600.    1486.9    0800.    1484.5    1000.    1483.9
 19 - 1200.     1484.5     1500.    1486.5    2000.    1491.5    3000.    1506.5
 19 - 5000.     1541.5     9999.    1635.       .        .         .        .
 19 -      0
 19 - 27.0         14    0    0     0.0
 19 - 0000.     1540.9     0075.    1541.8    0125.    1539.6    0200.    1528.0
 19 - 0400.     1497.5     0600.    1486.9    0800.    1484.5    1000.    1483.9
 19 - 1200.     1484.5     1500.    1486.5    2000.    1491.5    3000.    1506.5
 19 - 5000.     1541.5     9999.    1635.       .        .         .        .
 19 -      0
 19 - 204.0        15   15    0     0.0
 19 - 0000.     1542.1     0050.    1543.0    0100.    1537.7    0200.    1516.7
 19 - 0300.     1497.7     0400.    1491.7    0500.    1487.8    0700.    1485.5
 19 - 0900.     1484.8     1100.    1484.7    1500.    1487.1    2000.    1491.8
 19 - 3000.     1506.5     5000.    1541.5    9999.    1635.0      .        .
 19 -      0
 19 - 504.0        14    2    0     0.0
 19 - 0000.     1543.6     0050.    1543.0    0125.    1517.4    0200.    1500.0
 19 - 0300.     1491.9     0400.    1488.6    0700.    1485.7    1000.    1484.1
 19 - 1200.     1484.5     1500.    1486.6    2000.    1491.5    3000.    1507.1
 19 - 5000.     1541.8     9999.    1635.0      .        .         .        .
 19 -      0
 19 - 654.0        16         0     0.0
 19 - 0000.     1544.1     0050.    1544.2    0100.    1542.4    0150.    1532.9
 19 - 0200.     1517.0     0300.    1501.8    0400.    1492.2    0500.    1488.3
 19 - 0800.     1486.0     1000.    1484.7    1200.    1485.5    1500.    1487.3
 19 - 2000.     1492.3     3000.    1507.1    5000.    1541.8    9999.    1635.0
 19 -      END OF PROFS
 19 -      5
 19 - 0.0       10800.     4.       10200.    48.      10400.    54.      9800.
 19 - 500.      8000.
 19 -      1
 19 - 0.0            2
* 20 - 7/8/9 END OF RECORD CARD
```

FIGURE 5: NEWPE EXECUTION DECK

Comment Number:	Card Image:
* 21 -	7/8/9 END OF RECORD CARD
22 -	NEW PE NORDA BENCHMARK
22 -	3 0 1 1 120 1 3
22 -	0.0 500. 140.
22 -	12903.5 70. 0.0 13000. 70. 10.
22 -	20. 60. 300.
22 -	0.0 11. 194.46 19. 209.25 11.
**23 -	6/7/8/9 END OF JOB CARD

* This image represents a card with a 7/8/9 multi-punch in Col. 1.

** This image represents a card with a 6/7/8/9 multi-punch in Col. 1.

FIGURE 5: NEWPE EXECUTION DECK (continued)

The following comments refer to card images in the NEWPE execution deck listed in Figure 5.

Comment Number:	Comment:
1	Declare the program tape to be used.
2	Mount unlabeled program tape with local file name OLDPL. Density = 800 BPI (HY). No write ring.
3	Position program tape before the 8th PL, i.e., the 8th binary record.
4	This is done to minimize mass storage usage.
5	Create compile file from 8th PL on tape.
6	This card is needed because UPDATE R option inhibits automatic rewind.
7	Create the binary file INFACE.
8	Create compile file from 9th PL on tape.
9	Create the binary file AUTOCF.
10	Include AUTOCF in the executable module INFACE.

Comment Number:	Comment:
11	Load and execute INFACE. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
12	Create compile file from 10th PL on tape.
13	Program tape no longer needed.
14	Create the binary file NEWPE.
15	Load and execute NEWPE. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
16	Updates to INFACE, if any, follow this card. Updates may be necessary to modify site dependent coding.
17	Updates to AUTOCF, if any, follow this card. Updates may be necessary to modify site dependent coding.
18	Data for INFACE follow this card.
19	INFACE data cards.
20	Updates to NEWPE, if any, follow this card. Updates may be necessary to modify site dependent coding.
21	Data for NEWPE follow this card.
22	NEWPE data cards.
23	End of deck.

IV.6 Output

The expected output from running the NEWPE execution deck is listed in Figure 6.

---- AUTO-OCEAN INTERFACE ENTERED ----

FIGURE 6: EXPECTED NEWPE OUTPUT

```
----CFIELD ENTERED----

**********************************************************************

                        PROFILE     1
                    RANGE=    0.00 NMI.
                                          SPHERICAL EARTH PROFILE
          INPUT PROFILE

        DEPTH(M)      SPEED(M/S)      DEPTH(FT)     SPEED(FT/S)    GRAD(1/SEC)
( 1)      0.000        1540.900          0.000        5055.446       .122E-01
( 2)     75.000        1541.800        246.064        5058.458      -.43BE-01
( 3)    125.000        1539.600        410.104        5051.280      -.154E+00
( 4)    200.000        1528.000        656.178        5013.781      -.152E+00
( 5)    400.000        1497.500       1312.377        4913.386      -.52BE-01
( 6)    600.000        1486.900       1968.597        4878.740      -.11BE-01
( 7)    800.000        1484.500       2624.837        4871.018      -.277E-02
( 8)   1000.000        1483.900       3281.097        4869.203       .323E-02
( 9)   1200.000        1484.500       3937.379        4871.324       .690E-02
( 10)  1500.000        1486.500       4921.839        4878.117       .102E-01
( 11)  2000.000        1491.500       6562.710        4894.909       .152E-01
( 12)  3000.000        1506.500       9844.837        4944.914       .177E-01
( 13)  5000.000        1541.500      16410.638        5061.187       .190E-01
( 14)  9999.000        1635.000      32830.860        5372.605       .190E-01
( 15)                                32834.047        5372.665

     1 INTERPOLATED PROFILES REQUESTED.

 THERE IS(ARE)  0 SPECIFIED CONNECTION(S).

**********************************************************************

                        PROFILE     2
                    RANGE=   27.00 NMI.
                                          SPHERICAL EARTH PROFILE
          INPUT PROFILE

        DEPTH(M)      SPEED(M/S)      DEPTH(FT)     SPEED(FT/S)    GRAD(1/SEC)
( 1)      0.000        1540.900          0.000        5055.446       .122E-01
( 2)     75.000        1541.800        246.064        5058.458      -.43BE-01
( 3)    125.000        1539.600        410.104        5051.280      -.154E+00
( 4)    200.000        1528.000        656.178        5013.781      -.152E+00
( 5)    400.000        1497.500       1312.377        4913.386      -.52BE-01
( 6)    600.000        1486.900       1968.597        4878.740      -.11BE-01
( 7)    800.000        1484.500       2624.837        4871.018      -.277E-02
( 8)   1000.000        1483.900       3281.097        4869.203       .323E-02
( 9)   1200.000        1484.500       3937.379        4871.324       .690E-02
( 10)  1500.000        1486.500       4921.839        4878.117       .102E-01
( 11)  2000.000        1491.500       6562.710        4894.909       .152E-01
( 12)  3000.000        1506.500       9844.837        4944.914       .177E-01
( 13)  5000.000        1541.500      16410.638        5061.187       .190E-01
( 14)  9999.000        1635.000      32830.860        5372.605       .190E-01
( 15)                                32834.047        5372.665

 THERE IS(ARE)  0 SPECIFIED CONNECTION(S).

**********************************************************************

                        PROFILE     3
                    RANGE=  204.00 NMI.
                                          SPHERICAL EARTH PROFILE
          INPUT PROFILE

        DEPTH(M)      SPEED(M/S)      DEPTH(FT)     SPEED(FT/S)    GRAD(1/SEC)
( 1)      0.000        1542.100          0.000        5059.383       .1A2E-01
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
(  3)    100.000      1517.700        328.087      5045.027      -.210E+00
(  4)    200.000      1516.700        656.178      4976.206      -.190E+00
(  5)    300.000      1497.700        984.275      4913.945      -.59ME-01
(  6)    400.000      1491.700       1312.377      4894.336      -.18ME-01
(  7)    500.000      1487.800       1640.484      4881.617      -.11E-01
(  8)    700.000      1485.500       2296.714      4874.223      -.42E-02
(  9)    900.000      1484.800       2952.964      4872.079      -.26E-03
( 10)   1100.000      1484.700       3609.235      4871.904       .623E-02
( 11)   1500.000      1487.100       4921.839      4880.086       .963E-02
( 12)   2000.000      1491.800       6562.710      4895.494       .149E-01
( 13)   3000.000      1496.500       9844.837      4944.914       .177E-01
( 14)   5000.000      1541.500      16410.636      5061.387       .190E-01
( 15)   9999.000      1635.000      32830.860      5372.605       .190E-01
( 16)                               32834.047      5372.665
        15 INTERPOLATED PROFILES REQUESTED.

     THERE IS(ARE)  0 SPECIFIED CONNECTION(S).
**********************************************************************

                              PROFILE    4
                          RANGE= 504.00 NMI.
          INPUT PROFILE                          SPHERICAL EARTH PROFILE

      DEPTH(M)      SPEED(M/S)       DEPTH(FT)     SPEED(FT/S)    GRAD(1/SEC)
(  1)     0.000      1543.600           0.000      5064.304      -.11ME-01
(  2)    50.000      1543.000         164.043      5062.376      -.341E+00
(  3)   125.000      1517.400         410.109      4978.444      -.232E+00
(  4)   200.000      1500.000         656.178      4921.414      -.80ME-01
(  5)   300.000      1491.900         984.275      4894.916      -.32ME-01
(  6)   400.000      1488.600        1312.377      4884.165      -.963E-02
(  7)   700.000      1485.700        2296.714      4874.879      -.510E-02
(  8)  1000.000      1484.100        3281.097      4869.859       .223E-02
(  9)  1200.000      1484.500        3937.379      4871.324       .723E-02
( 10)  1500.000      1486.600        4921.839      4878.445       .100E-01
( 11)  2000.000      1491.500        6562.710      4894.909       .158E-01
( 12)  3000.000      1497.100        9844.837      4946.883       .176E-01
( 13)  5000.000      1541.800       16410.636      5062.372       .189E-01
( 14)  9999.000      1635.000       32830.860      5372.605       .189E-01
( 15)                               32834.047      5372.665
        2 INTERPOLATED PROFILES REQUESTED.

     THERE IS(ARE)  0 SPECIFIED CONNECTION(S).
**********************************************************************

                              PROFILE    5
                          RANGE= 654.00 NMI.
          INPUT PROFILE                          SPHERICAL EARTH PROFILE

      DEPTH(M)      SPEED(M/S)       DEPTH(FT)     SPEED(FT/S)    GRAD(1/SEC)
(  1)     0.000      1544.100           0.000      5065.945       .224E-02
(  2)    50.000      1544.200         164.043      5066.313      -.35ME-01
(  3)   100.000      1542.400         328.087      5060.447      -.190E+00
(  4)   150.000      1532.900         492.132      5029.318      -.31ME+00
(  5)   200.000      1517.000         656.178      4977.190      -.152E+00
(  6)   300.000      1501.800         984.275      4927.347      -.95ME-01
(  7)   400.000      1492.200        1312.377      4895.977      -.18ME-01
(  8)   500.000      1488.300        1640.484      4883.257      -.743E-02
(  9)   600.000      1486.000        1968.597      4875.940      -.82E-02
( 10)  1000.000      1484.700        3281.097      4871.428       .62E-02
( 11)  1200.000      1485.500        3937.379      4874.053       .62E-02
( 12)  1500.000      1487.300        4921.839      4880.742       .102E-01
( 13)  2000.000      1492.100        6562.710      4897.535       .150E-01
( 14)  3000.000      1502.100        9844.837      4930.883       .17ME-01
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
( 16)  9999.000     1635.000     32830.860    5372.605     .189E-01
( 17)                            32834.047    5372.665

                  ----CFIELD FINISHED----
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

BATHYMETRY CARD INPUT IS-

RANGE(NM)	DEPTH
0.00	10800.00
4.00	10200.00
48.00	10400.00
54.00	9800.00
500.00	8000.00

THE RESULT OF MERGING THE BATHYMETRY DATA WITH THE BOTTOM CLASS DATA IS-
(THIS WILL BE THE BATHYMETRY FOR MPP AND PE)

	RANGE(NM)	DEPTH(FT)	0-5 CLASS	0-9 CLASS
(1)	0.00	10800.000	2	0
(2)	4.00	10200.000	2	0
(3)	48.00	10400.000	2	0
(4)	54.00	9800.000	2	0
(5)	500.00	8000.000	2	0

THE FINAL BATHYMETRY/BOTTOM CLASS DATA FOR ASTRAL AND FACTEX IS -

	RANGE(NM)	DEPTH(FT)	0-5 CLASS	0-9 CLASS
(1)	0.00	10800.000	2	0
(2)	4.00	10200.000	2	0
(3)	13.50	10243.182	2	0
(4)	27.00	10304.545	2	0
(5)	48.00	10400.000	2	0
(6)	54.00	9800.000	2	0
(7)	204.00	9194.619	2	0
(8)	222.75	9118.946	2	0
(9)	241.50	9043.274	2	0
(10)	260.25	8967.601	2	0
(11)	279.00	8891.928	2	0
(12)	297.75	8816.256	2	0
(13)	316.50	8740.583	2	0
(14)	335.25	8664.910	2	0
(15)	354.00	8589.238	2	0
(16)	372.75	8513.565	2	0
(17)	391.50	8437.892	2	0
(18)	410.25	8362.220	2	0
(19)	429.00	8286.547	2	0
(20)	447.75	8210.874	2	0
(21)	466.50	8135.202	2	0
(22)	485.25	8059.529	2	0
(23)	500.00	8000.000	2	0
(24)	504.00	8000.000	2	0
(25)	554.00	8000.000	2	0
(26)	604.00	8000.000	2	0
(27)	654.00	8000.000	2	0

--- THERE ARE MORE THAN 26 SOUND SPEED PROFILES
EXCESS IGNORED IN ASTRAL PROCESSING.

---- AUTO-OCEAN INTERFACE TERMINATED NORMALLY ----

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
--- PROGRAM  NEW PE  ENTERED ---

NEW PE NORDA BENCHMARK

NO. OF OUTPUT DEPTHS          =          3
NO. OF RANGE PAIRS FOR A & P  =          0
FLAT BOTTOM FLAG              =          1
PRINT FLAG                    =          1
NO. OF FIELD PLOT DEPTHS      =        120
NUMBER OF PLOTS/MILE          =          1
NO. OF BOTTOM LOSS REGIONS    =          3
LINK PLOT FLAG                =          0
NEW RANGE STEP                = 0.0000000 NM
MIN RANGE FOR NEW RANGE STEP  =       0.00 NM
MAX RANGE FOR NEW RANGE STEP  =       0.00 NM

IFLAT HAS BEEN RESET TO       5
THE BOTTOM IS RANGE DEPENDENT.

INPUT RANGE          =       0.00 NM
INPUT DEPTH          =     500.00 FT
FREQUENCY            =     140.00 HZ
BEAM WIDTH           =       0.00 DEG
VOL. ATTEN. FACTOR   =       0.00
NO. OF AVG DEPTHS    =          0
WINDOW LENGTH        =       0.00 NM

 SOUND VELOCITY PROFILES MODIFIED TO CORRECT PARABOLIC PHASE VELOCITIES.

BEAM WIDTH HAS BEEN RESET TO      20.00 DEG

MAXIMUM DEPTH                 =  12903.50 FT
TERMINATE RUN AT RANGE        =     70.00 NM
MINIMUM FIELD PLOT DEPTH      =      0.00 FT
MAXIMUM FIELD PLOT DEPTH      =  13000.00 FT
MINIMUM FIELD PLOT LOSS       =     70.00 DB
FIELD PLOT LOSS INCREMENT     =     10.00 DB

 VARIABLE RANGE STEP SIZE RUN.

 OUTPUT DEPTHS
  1        20.00 FT
  2        60.00 FT
  3       300.00 FT

       BATHYMETRY
POINT   RANGE(NM) DEPTH(FT)
   1       0.00     10800.0
   2       4.00     10200.0
   3      48.00     10400.0
   4      54.00      9800.0
   5     500.00      8000.0

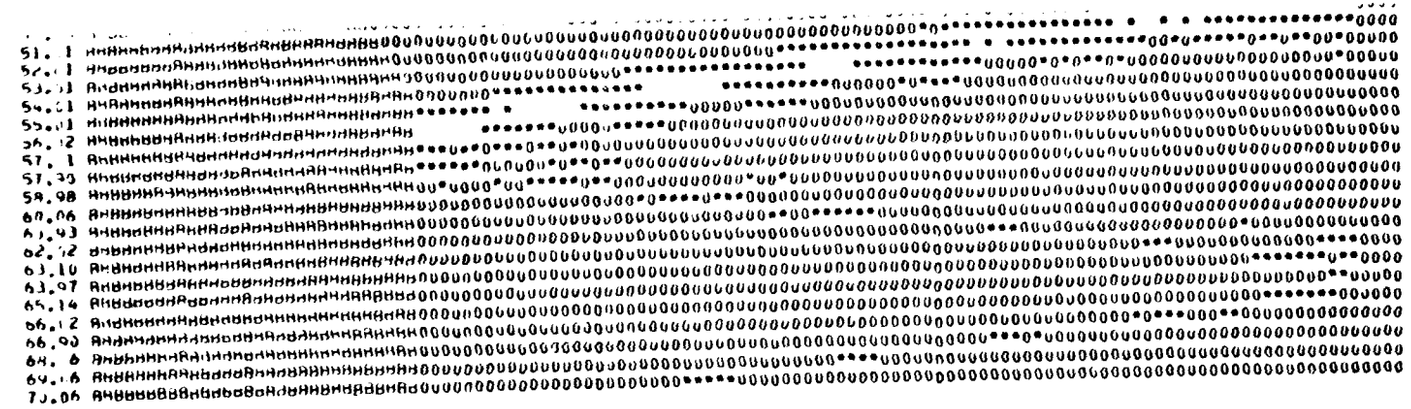
   BOTTOM SPECIFICATIONS
   RANGE    CRITICAL ANGLE
   0.0 NM    11.0 DEGREES
 194.5 NM    19.0 DEGREES
 209.3 NM    11.0 DEGREES

THE MAXIMUM DEPTH HAS BEEN RESET TO   12903.50 FT

SELECTED TRANSFORM SIZE = 384 W
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)



RUN TERMINATED AT RANGE STEP 1129.

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
NEW PE NORDA BENCHMARK

TRANSMISSION LOSS --
INPUT DEPTH =   500.0 FT
FREQUENCY   =   140.0 HZ

DEPTH =     20     60    300
RANGE  ------------------------------------------------------------------------------------------
     .04   84.5   75.9   58.7
     .07   76.6   68.9   55.2
     .11   72.9   65.0   49.9
     .15   69.2   61.3   48.0
     .19   64.5   57.1   50.6
     .22   59.7   53.3   53.6
     .26   55.4   51.3   53.5
     .30   54.0   52.2   55.7
     .33   54.5   57.4   56.7
     .37   57.8   56.3   57.9
     .41   58.0   55.7   54.5
     .45   58.3   55.8   57.4
     .48   60.2   55.1   60.2
     .52   61.4   55.7   56.6
     .56   62.1   56.2   56.8
     .60   63.2   56.8   56.6
     .63   64.6   57.3   64.5
     .67   65.4   58.1   67.6
     .71   66.0   58.9   66.8
     .74   67.6   59.3   62.3
     .78   68.1   60.3   60.7
     .82   69.0   60.9   60.0
     .86   69.8   61.6   60.3
     .89   70.7   62.3   60.8
     .93   71.4   63.0   61.8
     .97   72.1   63.7   63.2
    1.00   73.0   64.3   64.9
    1.04   73.7   65.0   66.8
    1.08   74.4   65.7   69.2
    1.12   75.0   66.3   72.1
    1.15   75.9   66.9   74.8
    1.19   76.4   67.6   76.6
    1.23   77.1   68.2   77.2
    1.27   77.7   68.8   76.7
    1.30   78.4   69.4   75.2
    1.33   79.0   69.9   73.7
    1.36   79.3   70.3   72.8
    1.39   79.8   70.7   72.0
    1.41   80.3   71.1   71.4
    1.44   80.6   71.5   71.0
    1.47   81.0   71.9   70.6
    1.50   81.3   72.2   70.2
    1.52   81.8   72.6   70.0
    1.55   82.2   72.9   69.8
    1.58   82.4   73.3   69.7
    1.61   82.7   73.6   69.6
    1.64   83.1   73.9   69.6
    1.66   83.5   74.2   69.6
    1.69   83.8   74.5   69.6
    1.72   83.9   74.8   69.6
    1.75   84.1   75.1   69.7
    1.77   84.5   75.4   69.8
    1.80   84.9   75.6   69.9
    1.83   85.1   75.9   70.0
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

1.89	85.6	76.4	70.2
1.91	85.8	76.7	70.4
1.94	86.1	77.0	70.5
1.97	86.5	77.3	70.7
2.00	86.8	77.6	70.8
2.02	87.1	77.9	71.0
2.05	87.4	78.2	71.2
2.08	87.7	78.5	71.3
2.11	87.9	78.8	71.5
2.14	88.2	79.0	71.7
2.16	88.5	79.3	71.9
2.19	88.8	79.7	72.0
2.22	89.1	80.0	72.2
2.25	89.5	80.3	72.4
2.27	90.0	80.7	72.6
2.30	90.3	81.0	72.7
2.33	90.6	81.3	72.9
2.36	90.8	81.6	73.1
2.39	91.1	81.9	73.3
2.41	91.4	82.2	73.5
2.44	91.8	82.5	73.7
2.47	92.1	82.7	73.9
2.50	92.3	83.0	74.1
2.52	92.5	83.3	74.3
2.55	92.8	83.6	74.5
2.58	93.1	83.9	74.7
2.61	93.5	84.2	74.9
2.64	93.9	84.5	75.1
2.66	94.2	84.8	75.3
2.69	94.5	85.1	75.6
2.72	94.7	85.4	75.8
2.75	95.0	85.6	76.0
2.77	95.2	85.9	76.2
2.80	95.4	86.2	76.4
2.83	95.7	86.4	76.7
2.86	96.0	86.7	76.9
2.89	96.2	86.9	77.1
2.91	96.5	87.1	77.3
2.94	96.7	87.4	77.5
2.97	96.9	87.6	77.8
3.00	97.2	87.8	78.0
3.03	97.4	88.0	78.2
3.05	97.6	88.3	78.4
3.08	97.7	88.5	78.7
3.11	97.9	88.7	78.9
3.14	98.2	88.9	79.1
3.16	98.5	89.2	79.4
3.19	98.8	89.4	79.6
3.22	99.0	89.6	79.8
3.25	99.2	89.9	80.0
3.28	99.4	90.1	80.3
3.30	99.6	90.3	80.5
3.33	99.9	90.5	80.7
3.36	100.1	90.7	80.9
3.39	100.3	90.9	81.1
3.41	100.4	91.1	81.3
3.44	100.6	91.3	81.6
3.47	100.7	91.4	81.8
3.50	101.0	91.6	82.0
3.53	101.2	91.8	82.2
3.55	101.3	92.0	82.4
3.58	101.5	92.2	82.6
3.61	101.6	92.4	82.8
3.64	101.8	92.5	83.1
3.66	102.0	92.7	83.3

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

3.72	102.4	93.1	83.7
3.75	102.6	93.3	83.9
3.78	102.7	93.4	84.1
3.80	102.9	93.6	84.3
3.83	103.1	93.8	84.6
3.86	103.3	94.0	84.8
3.89	103.5	94.1	85.0
3.91	103.6	94.3	85.2
3.94	103.7	94.5	85.4
3.97	103.9	94.6	85.6
4.00	104.1	94.8	85.8
4.03	104.3	95.0	86.0
4.05	104.5	95.2	86.2
4.08	104.6	95.	.4
4.11	104.7	95.	.6
4.14	104.9	95.	.8
4.16	105.1	95.8	86.9
4.19	105.3	96.0	87.1
4.22	105.5	96.2	87.3
4.25	105.6	96.4	87.5
4.28	105.8	96.5	87.7
4.30	106.0	96.7	87.9
4.33	106.2	96.9	88.1
4.36	106.4	97.1	88.3
4.39	106.5	97.3	88.5
4.41	106.7	97.5	88.6
4.44	106.9	97.6	88.8
4.47	107.1	97.8	89.0
4.50	107.3	98.0	89.2
4.53	107.5	98.2	89.4
4.55	107.7	98.4	89.6
4.58	107.8	98.6	89.7
4.61	108.0	98.8	89.9
4.64	108.2	99.0	90.1
4.66	108.5	99.2	90.3
4.69	108.7	99.3	90.5
4.72	108.8	99.5	90.6
4.75	109.0	99.7	90.8
4.78	109.2	99.9	91.0
4.80	109.4	100.1	91.2
4.83	109.6	100.3	91.4
4.86	109.8	100.5	91.5
4.89	109.9	100.7	91.7
4.91	110.1	100.9	91.9
4.94	110.3	101.0	92.1
4.97	110.6	101.2	92.3
5.00	110.8	101.4	92.4
5.03	110.9	101.6	92.6
5.05	111.1	101.8	92.8
5.08	111.2	101.9	93.0
5.11	111.4	102.1	93.2
5.14	111.6	102.3	93.4
5.16	111.8	102.5	93.5
5.19	112.0	102.7	93.7
5.22	112.2	102.9	93.9
5.25	112.3	103.1	94.1
5.28	112.5	103.2	94.3
5.30	112.7	103.4	94.4
5.33	112.9	103.6	94.6
5.36	113.1	103.8	94.8
5.39	113.3	104.0	95.0
5.41	113.5	104.2	95.2
5.44	113.6	104.3	95.4
5.47	113.8	104.5	95.5
5.50	113.9	104.7	95.7

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

5.55	114.3	105.1	96.1
5.58	114.5	105.2	96.3
5.61	114.7	105.4	96.4
5.64	114.9	105.6	96.6
5.66	115.1	105.8	96.8
5.69	115.3	106.0	97.0
5.72	115.5	106.2	97.2
5.75	115.7	106.4	97.4
5.78	115.9	106.6	97.6
5.82	116.0	106.8	97.8
5.86	116.3	107.0	98.0
5.89	116.6	107.3	98.3
5.93	116.9	107.5	98.5
5.96	117.0	107.8	98.7
6.00	117.2	108.0	98.9
6.03	117.4	108.2	99.2
6.07	117.7	108.4	99.4
6.11	118.0	108.6	99.6
6.14	118.1	108.8	99.9
6.18	118.3	109.1	100.1
6.21	118.6	109.3	100.4
6.25	118.9	109.5	100.6
6.29	119.1	109.8	100.8
6.32	119.3	110.0	101.0
6.36	119.5	110.2	101.3
6.39	119.8	110.5	101.5
6.43	120.0	110.7	101.7
6.46	120.1	110.9	102.0
6.50	120.3	111.1	102.2
6.54	120.6	111.4	102.4
6.57	121.0	111.6	102.6
6.61	121.2	111.9	102.9
6.64	121.3	112.1	103.1
6.68	121.5	112.3	103.3
6.72	121.7	112.5	103.6
6.75	122.1	112.8	103.8
6.79	122.4	113.0	104.0
6.82	122.5	113.2	104.2
6.87	122.8	113.5	104.5
6.92	123.1	113.8	104.8
6.96	123.4	114.1	105.1
7.01	123.7	114.4	105.4
7.06	123.9	114.6	105.7
7.11	124.1	114.9	106.0
7.15	124.4	115.2	106.3
7.20	124.8	115.5	106.6
7.25	125.2	115.9	106.9
7.29	125.5	116.2	107.2
7.34	125.8	116.5	107.5
7.39	126.0	116.7	107.8
7.44	126.3	117.1	108.1
7.48	126.7	117.4	108.4
7.53	127.0	117.7	108.7
7.59	127.4	118.0	109.0
7.66	127.7	118.4	109.4
7.72	128.	118.8	109.8
7.78	128.	119.2	110.2
7.84	128.	119.6	110.6
7.92	129.	120.1	111.1
8.00	129.7	120.6	111.5
8.08	130.5	121.0	112.1
8.16	130.6	121.5	112.5
8.24	131.5	122.1	113.1
8.32	131.8	122.5	113.5
8.40	132.3	123.1	114.1

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
 8.56 132.3 123.9 115.0
 8.64 130.5 124.5 115.6
 8.72 131.6 124.7 115.9
 8.80 140.5 125.9 116.9
 8.88 130.5 125.4 116.4
 8.96 166.1 127.4 118.5
 9.04 128.9 125.8 116.6
 9.12 138.1 126.9 120.7
 9.20 127.1 125.6 116.3
 9.28 130.9 126.2 123.8
 9.36 125.2 124.7 116.4
 9.44 126.2 125.8 124.8
 9.52 124.3 124.5 117.6
 9.60 124.0 125.0 121.5
 9.68 125.5 126.4 119.4
 9.76 124.5 124.9 122.3
 9.84 129.9 129.3 121.0
 9.92 130.2 129.4 121.5
10.00 140.2 129.4 123.4
10.08 134.1 136.7 119.6
10.16 129.6 127.6 129.3
10.24 125.2 125.5 121.9
10.32 126.2 130.6 126.6
10.40 125.2 126.6 123.7
10.48 126.5 127.0 123.8
10.56 128.7 131.5 122.4
10.64 126.7 127.1 124.0
10.72 127.3 130.0 122.6
10.80 126.0 125.4 123.3
10.88 124.9 122.7 130.9
10.96 126.2 124.0 122.5
11.04 127.9 125.2 121.9
11.12 127.9 123.4 123.9
11.20 127.1 122.0 124.3
11.28 125.9 121.4 124.2
11.36 124.9 121.3 124.3
11.44 123.9 120.1 124.6
11.52 123.0 118.9 127.0
11.60 123.4 118.7 123.9
11.68 124.6 119.9 121.6
11.75 127.4 122.0 121.4
11.83 131.5 123.9 119.5
11.91 130.3 124.0 117.3
11.99 129.7 121.5 116.8
12.07 123.6 118.5 115.6
12.15 122.4 116.8 116.3
12.23 122.1 115.5 118.6
12.31 118.7 114.3 116.5
12.39 119.0 113.9 115.6
12.47 121.3 114.0 116.4
12.55 118.9 113.3 115.1
12.63 118.1 112.9 116.0
12.71 119.8 113.8 117.2
12.79 122.8 115.9 118.6
12.87 127.2 118.0 121.2
12.95 125.0 117.9 117.7
13.03 124.7 118.3 113.2
13.11 132.6 121.3 111.1
13.19 128.3 118.8 110.7
13.27 120.1 113.2 110.6
13.35 116.7 109.9 110.2
13.43 115.1 108.1 110.0
13.51 114.7 107.5 109.2
13.59 115.3 107.8 107.1
13.67 116.8 108.7 104.7
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
13.03 119.8 110.3 102.0
13.09 118.7 109.2 101.7
13.15 116.5 107.8 101.9
14.01 116.8 106.5 102.3
14.07 113.7 105.3 102.7
14.13 112.8 104.5 103.1
14.19 112.2 103.9 103.4
14.25 111.9 103.6 103.6
14.31 111.9 103.4 103.7
14.37 111.9 103.5 104.0
14.43 112.3 103.7 104.5
14.49 112.7 104.1 105.1
14.55 113.4 104.6 106.0
14.61 114.0 105.2 107.0
14.67 114.9 105.8 107.9
14.72 115.7 106.5 108.6
14.78 116.5 107.1 109.0
14.84 116.8 107.4 108.8
14.90 116.9 107.5 108.4
14.96 116.8 107.4 108.0
15.02 116.3 107.1 107.9
15.12 115.7 106.6 108.2
15.21 115.0 106.0 108.4
15.30 114.2 105.4 105.9
15.40 113.6 104.9 103.0
15.49 113.0 104.4 101.0
15.66 113.1 103.8 99.1
15.83 111.3 103.7 97.6
16.00 114.8 104.1 95.2
16.17 114.9 105.8 93.5
16.34 120.9 108.1 92.8
16.65 121.4 113.3 93.0
16.97 126.1 118.2 98.3
17.29 119.7 112.0 111.0
17.60 114.6 109.5 108.3
17.92 118.8 110.6 103.1
17.98 115.2 108.4 103.6
18.03 113.2 106.5 101.6
18.09 113.4 107.1 101.1
18.15 119.6 109.0 101.1
18.20 120.7 112.2 101.7
18.26 126.4 114.9 102.6
18.32 126.8 115.2 103.4
18.37 118.9 110.4 102.4
18.43 115.2 108.7 102.6
18.49 116.9 107.9 103.3
18.54 115.6 108.5 104.0
18.60 117.5 110.0 104.9
18.66 123.2 113.9 106.9
18.71 132.5 116.4 107.6
18.77 120.7 113.0 108.0
18.83 119.0 110.8 107.8
18.88 118.4 110.1 107.1
18.94 118.1 110.1 106.5
19.00 118.9 111.0 106.6
19.05 121.6 113.6 106.8
19.11 126.9 116.1 106.9
19.17 130.3 118.2 106.6
19.22 127.3 117.1 106.0
19.28 124.7 115.4 105.0
19.34 122.8 114.1 104.0
19.39 122.0 113.4 103.3
19.45 122.3 113.5 103.1
19.51 123.0 113.9 103.2
19.57 123.9 114.6 103.3
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
19.68  125.2  115.4  103.7
19.74  124.7  115.3  103.8
19.79  124.4  115.0  104.0
19.85  123.8  114.8  104.1
19.91  124.0  115.0  104.5
19.96  124.9  115.4  104.9
20.02  124.9  115.8  105.4
20.08  126.0  116.2  106.1
20.13  125.6  116.1  106.7
20.19  124.3  116.0  107.3
20.25  126.3  116.3  108.4
20.30  125.6  116.4  108.9
20.36  124.6  116.7  109.8
20.42  128.6  117.6  111.4
20.47  126.9  117.4  111.8
20.53  124.5  117.1  112.4
20.59  128.0  117.8  114.2
20.64  127.9  117.7  114.1
20.70  124.1  117.3  113.1
20.76  127.2  118.5  113.4
20.81  133.6  119.4  113.4
20.87  124.5  117.9  111.8
20.93  125.2  118.0  111.5
20.98  133.8  119.3  111.5
21.04  126.3  118.7  110.2
21.10  125.8  118.5  110.1
21.15  131.8  119.9  110.2
21.21  129.8  120.3  109.5
21.27  128.0  119.5  109.6
21.32  128.5  119.5  109.6
21.38  129.3  120.2  109.2
21.44  130.9  120.4  109.5
21.50  128.3  120.0  109.8
21.55  127.9  120.4  109.9
21.61  132.9  122.1  110.3
21.67  133.6  122.9  110.8
21.72  130.3  122.3  112.1
21.78  131.3  122.4  113.3
21.84  132.7  123.9  113.1
21.89  137.1  124.3  113.7
21.95  137.9  125.2  115.6
22.01  128.8  121.6  117.8
22.06  126.7  120.1  120.1
22.12  128.5  120.7  120.3
22.18  132.6  123.1  119.9
22.23  138.0  125.9  121.1
22.29  135.2  123.5  123.2
22.35  126.7  119.4  124.6
22.40  123.6  117.2  125.4
22.46  123.3  116.6  126.5
22.52  124.2  117.5  126.0
22.57  125.6  119.8  126.5
22.63  128.6  125.0  124.4
22.69  130.7  132.6  120.5
22.74  127.8  123.1  118.6
22.80  125.2  119.2  117.5
22.86  123.8  117.6  116.7
22.91  123.6  117.4  116.8
22.97  124.6  118.5  118.0
23.03  126.9  121.1  118.5
23.08  131.0  126.3  118.8
23.14  135.1  138.9  119.5
23.20  131.5  127.4  119.2
23.26  128.3  123.0  119.1
23.31  126.7  121.2  120.0
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
23.46 127.9 122.8 133.1
23.53 130.3 125.9 131.6
23.60 132.3 128.7 128.3
23.67 132.9 128.6 124.5
23.76 133.3 128.2 120.0
23.85 134.8 129.9 119.1
23.95 135.7 131.0 122.0
24.04 135.1 129.3 121.7
24.13 134.9 128.0 118.4
24.29 137.1 130.2 118.9
24.46 142.7 138.4 123.4
24.62 141.9 133.4 122.2
24.78 138.7 131.1 123.7
24.94 138.5 131.4 124.6
25.04 138.5 131.8 123.4
25.14 142.0 133.5 123.3
25.24 141.2 134.1 125.2
25.33 142.7 135.0 127.1
25.43 143.2 135.5 134.3
25.53 143.7 135.7 138.8
25.63 143.0 136.2 133.3
25.73 146.0 136.7 131.4
25.82 151.9 138.8 130.1
25.92 145.9 138.1 129.4
25.99 148.5 140.4 129.7
26.05 151.0 140.6 130.1
26.12 148.1 140.1 130.4
26.18 148.7 141.6 129.8
26.24 154.9 141.5 129.5
26.31 147.9 140.7 129.0
26.37 149.6 141.7 128.0
26.44 155.9 141.4 127.7
26.50 146.6 140.6 126.9
26.57 152.3 140.8 126.5
26.63 150.2 140.6 126.1
26.70 147.3 139.8 125.5
26.76 150.9 140.6 125.6
26.83 149.9 140.9 125.4
26.89 148.6 141.1 125.5
26.96 153.2 143.5 125.8
27.02 157.4 146.3 125.8
27.09 156.0 147.8 126.4
27.15 163.7 149.5 127.0
27.21 156.8 149.4 127.8
27.28 158.5 150.9 128.5
27.34 169.3 157.9 129.3
27.41 158.9 150.7 130.3
27.47 151.7 146.9 131.6
27.54 154.0 145.7 132.1
27.58 154.4 145.5 131.6
27.63 150.7 145.8 131.1
27.68 151.5 147.0 130.4
27.72 157.9 150.4 130.1
27.77 168.7 159.2 131.1
27.82 159.3 150.5 132.3
27.86 152.5 145.1 131.7
27.91 148.9 140.9 132.1
27.96 144.5 137.7 132.7
28.00 141.0 136.8 130.0
28.05 141.7 137.3 130.2
28.10 151.4 137.9 131.7
28.14 149.7 137.8 130.7
28.19 140.4 140.4 132.2
28.24 141.3 141.5 130.0
28.28 144.7 142.4 126.6
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

28.38	142.5	135.7	127.4
28.42	135.1	133.6	125.0
28.47	132.5	130.4	127.6
28.52	133.6	131.5	126.2
28.56	137.0	131.5	123.3
28.61	133.5	130.5	128.7
28.66	130.8	131.4	124.5
28.70	129.3	130.1	121.1
28.75	129.0	127.0	125.2
28.80	126.4	126.0	121.2
28.84	124.3	126.1	117.1
28.89	123.1	123.9	117.1
28.93	121.4	121.9	117.3
28.98	119.3	121.1	114.7
29.03	117.8	120.5	112.8
29.07	116.5	118.9	111.4
29.12	115.0	117.5	109.7
29.17	113.6	116.7	108.8
29.21	112.3	115.4	108.2
29.26	110.9	113.5	107.1
29.31	109.3	111.9	106.2
29.35	107.9	111.4	106.2
29.40	107.0	111.5	106.5
29.45	106.5	111.2	106.7
29.49	105.9	110.5	107.4
29.54	105.4	110.2	107.8
29.59	105.4	110.0	107.2
29.63	105.9	109.9	106.9
29.68	106.8	110.6	106.8
29.73	107.7	111.7	106.3
29.77	108.6	112.7	106.1
29.82	109.6	113.1	106.9
29.87	110.9	113.8	107.8
29.91	112.3	114.7	107.9
29.96	113.8	115.8	108.9
30.01	115.2	116.7	111.5
30.05	116.6	116.8	113.3
30.10	118.0	117.1	112.1
30.15	126.1	118.5	113.0
30.19	123.0	122.6	117.4
30.24	125.5	129.0	119.2
30.28	124.4	123.7	115.6
30.33	122.3	119.3	114.9
30.38	121.4	117.3	116.9
30.42	121.8	117.0	121.0
30.47	123.1	117.7	124.3
30.52	125.0	119.3	122.5
30.56	126.8	121.7	119.0
30.61	128.2	124.5	118.3
30.66	129.4	126.5	119.2
30.70	130.6	126.6	119.5
30.75	132.5	126.0	118.1
30.80	133.9	126.0	117.4
30.84	133.7	126.7	116.9
30.89	135.7	128.6	116.0
30.94	151.9	130.7	115.6
30.98	135.4	126.3	116.6
31.03	129.2	122.1	118.3
31.08	126.6	119.3	119.5
31.12	125.1	117.4	118.4
31.17	123.8	116.1	114.7
31.22	122.7	115.1	112.0
31.26	121.9	114.5	110.4
31.31	121.5	114.2	109.4
31.36	121.5	114.2	108.7

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

31.45	122.3	114.9	107.4
31.50	122.9	115.4	106.6
31.57	123.6	116.0	105.4
31.64	124.6	116.8	104.1
31.71	125.9	117.8	103.2
31.77	127.0	119.0	102.8
31.84	128.8	120.7	102.5
31.95	133.5	124.6	101.9
32.05	156.6	136.4	100.8
32.16	131.5	124.5	99.8
32.27	127.3	119.6	99.4
32.37	126.9	119.2	99.6
32.55	127.4	117.2	100.6
32.72	123.9	119.5	102.5
32.90	131.0	119.2	104.0
33.07	123.7	119.0	105.7
33.25	126.7	119.1	107.0
33.33	125.9	119.2	106.9
33.41	125.0	119.6	105.4
33.50	132.3	121.6	106.1
33.58	125.1	120.8	104.8
33.66	136.7	122.2	105.4
33.72	122.0	118.8	104.6
33.78	123.1	118.7	104.9
33.83	128.9	122.0	105.3
33.89	125.2	121.2	105.4
33.94	123.2	119.9	106.4
34.00	127.4	122.2	106.9
34.06	135.7	127.8	106.4
34.11	131.0	126.9	107.9
34.17	129.0	124.8	109.1
34.22	133.5	125.8	109.2
34.27	143.0	129.0	110.2
34.31	137.4	130.3	111.8
34.35	137.0	130.8	112.8
34.39	138.5	133.0	112.7
34.43	141.9	137.7	113.1
34.47	145.5	142.0	113.8
34.52	142.2	138.3	114.2
34.56	141.1	134.4	114.3
34.60	141.9	132.4	114.2
34.64	140.1	130.9	114.0
34.68	137.4	129.5	113.5
34.73	136.3	128.7	112.7
34.77	136.7	128.5	112.1
34.81	138.2	128.8	111.8
34.85	139.0	129.1	111.6
34.89	134.1	129.3	111.4
34.94	138.2	129.7	111.3
34.98	140.4	130.4	111.3
35.02	142.1	131.0	111.2
35.06	140.5	130.9	111.1
35.10	139.5	130.5	111.0
35.15	139.9	130.5	110.9
35.19	140.4	130.7	110.8
35.23	140.5	131.0	110.8
35.27	140.6	131.3	110.8
35.31	140.8	131.7	110.9
35.36	141.4	132.4	111.1
35.40	143.3	133.4	111.2
35.44	145.0	134.1	111.4
35.48	143.6	134.5	111.6
35.52	143.0	135.2	111.8
35.57	145.9	136.3	112.1
35.61	150.0	137.6	112.4

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
35.69 145.3 139.1 112.9
35.73 147.7 141.3 113.4
35.78 156.3 145.2 113.7
35.82 159.3 148.0 114.1
35.86 151.7 147.9 114.5
35.90 150.4 149.0 114.9
35.94 150.6 150.0 115.2
35.98 151.7 149.4 115.7
36.03 155.2 143.7 116.2
36.07 166.1 151.8 116.5
36.11 157.1 149.6 116.7
36.15 151.9 145.2 117.0
36.19 150.3 143.2 117.3
36.24 150.7 142.8 117.7
36.28 152.4 143.6 117.9
36.32 155.3 145.3 117.9
36.36 159.7 147.0 118.0
36.40 159.2 146.5 118.1
36.45 153.7 144.5 118.1
36.49 151.1 143.9 118.1
36.53 150.6 142.6 118.0
36.57 151.4 143.1 118.0
36.61 153.1 144.5 118.1
36.66 155.1 146.7 118.2
36.70 156.8 150.9 118.3
36.74 159.0 160.4 118.4
36.78 156.7 153.5 118.3
36.82 154.2 149.1 118.1
36.87 155.9 146.7 117.9
36.91 156.4 145.0 117.8
36.95 150.7 143.8 117.6
36.99 148.6 144.1 117.6
37.03 150.0 145.6 117.9
37.08 154.7 148.3 118.1
37.12 158.3 149.0 118.2
37.16 151.3 144.5 118.7
37.20 146.0 140.9 119.2
37.24 144.2 138.7 119.1
37.29 145.5 137.2 119.0
37.33 146.6 135.8 119.2
37.37 142.0 134.2 119.1
37.41 139.3 133.4 118.5
37.45 139.7 133.5 118.3
37.50 143.4 134.4 118.4
37.54 147.6 135.2 118.2
37.58 142.4 134.8 117.6
37.62 139.6 134.6 117.3
37.66 139.5 135.3 117.6
37.70 142.1 136.8 117.3
37.75 150.1 138.5 116.9
37.79 150.0 137.7 116.8
37.83 140.8 134.9 117.1
37.87 137.6 133.0 117.4
37.91 137.5 132.2 117.6
37.96 140.8 132.3 117.7
38.00 146.1 132.5 118.6
38.04 139.7 131.1 119.4
38.08 136.3 129.8 119.9
38.12 136.3 129.3 120.7
38.17 138.7 129.5 122.3
38.21 140.6 129.9 124.0
38.25 138.5 129.5 125.1
38.29 136.9 128.9 126.5
38.33 136.9 128.7 129.0
38.38 137.8 128.8 132.1
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

38.46	138.4	129.2	136.6
38.50	138.1	129.2	134.9
38.54	137.9	129.2	133.4
38.59	138.2	129.4	132.1
38.63	139.0	129.7	134.7
38.67	139.3	129.8	133.7
38.71	138.8	129.8	132.1
38.75	138.6	129.8	130.5
38.80	139.2	129.9	129.5
38.84	139.4	129.9	128.6
38.88	138.6	129.8	127.3
38.92	138.4	129.8	126.1
38.96	139.3	129.9	125.6
39.01	139.7	130.0	125.1
39.05	138.7	129.9	124.4
39.10	138.3	130.0	123.7
39.16	140.4	130.6	123.7
39.21	140.7	130.9	123.3
39.26	138.9	130.9	123.0
39.32	140.5	131.5	123.5
39.37	142.9	132.2	123.7
39.43	140.4	132.2	123.7
39.48	140.9	132.9	124.5
39.54	145.9	134.3	125.2
39.59	143.9	134.5	125.4
39.64	142.0	134.3	126.1
39.70	145.4	135.1	127.0
39.75	146.3	135.4	127.1
39.81	142.3	134.5	127.2
39.86	142.8	134.6	127.6
39.94	146.6	135.6	127.5
40.01	143.6	135.2	127.0
40.09	144.9	135.0	127.0
40.16	147.8	137.3	126.5
40.24	145.7	137.4	126.3
40.34	149.2	138.8	126.2
40.43	147.6	138.9	126.1
40.53	149.3	139.3	126.4
40.63	149.2	139.5	127.0
40.73	149.6	139.7	127.9
40.82	150.4	140.3	129.0
40.92	150.1	140.5	130.5
41.02	151.2	141.1	132.1
41.12	152.7	141.5	134.3
41.21	151.8	142.2	136.9
41.31	150.7	142.7	139.2
41.41	152.3	143.2	140.1
41.50	151.1	143.7	138.1
41.60	149.9	143.6	135.7
41.70	155.6	144.9	134.6
41.77	151.2	144.7	132.9
41.84	161.0	145.2	132.7
41.90	151.2	146.0	131.9
41.97	156.9	145.9	132.1
42.04	158.1	146.6	131.4
42.11	153.8	148.0	132.2
42.19	157.3	147.3	132.2
42.26	154.4	149.6	132.6
42.31	164.4	152.0	133.1
42.38	159.2	149.9	133.8
42.45	157.0	151.9	134.3
42.51	156.6	150.5	134.8
42.59	155.1	149.6	135.5
42.65	166.0	151.9	134.8
42.72	156.7	151.3	134.9

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
42.85 164.8 151.6 133.4
42.92 158.7 151.3 132.3
42.99 157.2 150.2 131.6
43.06 159.4 149.0 130.9
43.11 159.2 151.4 130.3
43.16 161.7 150.9 130.0
43.21 160.1 150.5 129.6
43.26 159.2 151.2 129.3
43.31 155.6 150.0 129.1
43.36 156.1 149.5 128.8
43.41 156.8 148.5 128.4
43.46 159.1 150.2 128.3
43.51 163.6 150.2 128.3
43.56 156.7 150.6 128.2
43.61 159.2 151.5 128.1
43.66 167.5 155.9 128.1
43.71 165.2 154.9 128.2
43.76 158.3 152.6 128.3
43.81 158.9 153.0 128.3
43.85 156.0 156.7 128.1
43.90 166.5 157.3 128.3
43.95 159.7 153.1 128.7
44.00 157.3 151.8 128.8
44.05 157.4 154.6 128.8
44.10 160.9 158.8 128.6
44.15 160.3 161.0 128.6
44.20 162.4 156.1 128.9
44.25 166.5 154.9 128.6
44.30 158.4 156.9 128.7
44.35 158.0 159.4 128.9
44.40 163.5 156.7 128.8
44.45 160.8 152.2 129.2
44.50 152.5 150.6 128.9
44.55 152.4 150.2 128.2
44.60 163.9 149.1 128.2
44.65 152.6 148.5 127.5
44.70 150.4 150.3 127.2
44.75 155.6 149.7 127.6
44.80 157.3 152.3 127.3
44.85 152.9 153.1 127.9
44.90 150.6 153.1 128.4
44.95 152.9 148   127.5
45.00 158.4 146   128.5
45.05 145.1 141   128.4
45.10 142.9 141   126.2
45.15 147         126.6
45.20 1           126.9
45.25 140.  138.3 125.0
45.30 139.8 138.0 124.6
45.33 142.1 139.1 124.8
45.37 146.7 141.5 124.3
45.41 153.6 144.8 123.8
45.44 149.4 144.0 123.8
45.48 144.9 141.0 123.9
45.52 142.6 138.8 123.5
45.55 141.9 137.5 122.9
45.59 142.9 137.  123.0
45.63 145.5 137.3 123.7
45.66 148.2 138.  124.4
45.70 148.4 138.4 124.5
45.74 147.8 137.3 124.5
45.77 144.9 135.5 124.7
45.81 141.3 134.1 125.1
45.85 139.9 133.5 125.9
45.88 140.8 133.1 127.1
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

45.96	142.1	133.3	129.9
45.99	140.7	133.9	130.8
46.03	142.5	134.5	133.6
46.06	148.8	134.8	134.4
46.10	144.3	134.6	134.6
46.14	140.7	134.7	140.7
46.17	142.4	134.4	140.9
46.21	144.7	133.9	138.7
46.25	141.6	132.6	135.4
46.28	137.4	132.1	137.3
46.32	137.7	131.8	139.2
46.36	142.4	131.6	139.1
46.39	143.5	131.2	137.9
46.43	136.2	130.5	141.0
46.47	135.0	130.8	138.5
46.50	136.9	131.4	133.6
46.54	145.3	132.7	132.8
46.58	145.9	133.3	135.8
46.61	137.9	133.1	139.4
46.65	136.7	133.8	134.4
46.69	139.2	135.1	131.5
46.72	145.1	137.1	131.2
46.76	142.0	137.0	132.1
46.80	138.5	135.2	133.4
46.83	138.6	134.1	132.8
46.87	142.5	134.6	131.6
46.91	157.3	136.4	130.5
46.94	145.3	134.9	128.8
46.98	139.6	132.4	126.9
47.01	137.3	130.6	125.1
47.05	136.7	129.8	124.0
47.09	137.2	129.9	123.4
47.12	139.2	130.7	122.5
47.16	142.3	131.7	121.0
47.20	143.7	132.2	119.4
47.23	141.5	131.7	118.1
47.27	139.3	130.7	117.1
47.31	138.1	129.9	116.3
47.34	137.6	129.7	115.6
47.38	138.0	130.1	114.8
47.42	139.4	131.1	114.1
47.45	141.9	132.7	113.3
47.49	145.5	134.9	112.5
47.54	151.2	137.1	111.6
47.58	147.5	135.8	110.8
47.63	142.2	133.5	109.9
47.68	140.5	132.2	109.2
47.72	140.7	131.9	108.5
47.77	141.3	132.8	108.0
47.82	143.5	134.9	107.6
47.86	152.5	138.6	107.3
47.91	150.5	138.4	107.1
47.96	144.2	134.9	106.7
48.02	140.9	131.6	106.3
48.09	137.6	129.4	105.8
48.16	137.1	129.6	105.4
48.23	140.8	131.0	105.2
48.29	142.3	134.1	105.1
48.39	151.0	140.4	105.0
48.49	145.9	135.4	104.8
48.58	143.3	131.6	104.7
48.68	145.4	131.4	104.7
48.78	143.9	132.1	104.7
48.92	148.1	137.9	104.6
49.07	139.8	132.3	104.2

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
49.36 139.9 123.2 105.0
49.41 135.3 131.1 105.4
49.45 132.4 130.2 105.9
49.49 135.0 131.7 106.7
49.53 132.6 131.8 106.6
49.57 142.0 135.5 107.3
49.96 135.0 139.1 108.4
50.02 138.4 140.7 108.2
50.08 140.0 136.4 108.8
50.14 134.3 133.6 109.2
50.20 135.9 132.1 109.1
50.26 147.4 139.0 109.6
50.32 140.8 136.0 109.6
50.38 137.3 136.6 110.2
50.43 147.9 139.7 110.2
50.49 143.7 137.4 110.2
50.55 139.0 135.6 110.3
50.59 145.9 137.4 110.4
50.64 142.2 134.4 110.3
50.68 142.3 134.3 110.1
50.72 144.7 134.6 110.1
50.76 143.3 135.7 110.3
50.80 143.8 137.4 110.4
50.84 147.9 140.3 110.5
50.89 153.3 146.5 110.5
50.93 154.5 152.8 110.4
50.97 151.7 145.0 110.5
51.01 147.8 140.7 110.5
51.05 145.8 138.7 110.5
51.09 144.4 137.9 110.5
51.14 148.1 137.8 110.7
51.18 147.9 137.5 110.8
51.22 145.7 137.5 111.0
51.26 146.7 138.1 111.2
51.30 152.4 139.1 111.3
51.34 150.5 139.1 111.5
51.39 146.6 138.0 111.6
51.43 146.1 137.6 111.6
51.47 148.4 138.0 111.7
51.51 150.6 138.2 111.8
51.55 147.0 137.3 111.9
51.59 144.7 136.6 112.1
51.64 145.1 136.7 112.2
51.68 147.8 137.6 112.4
51.72 150.3 138.6 112.5
51.76 149.0 138.5 112.6
51.80 147.1 137.8 112.9
51.84 146.0 137.6 113.1
51.89 146.3 138.2 113.3
51.93 148.8 139.9 113.5
51.97 154.4 142.4 113.7
52.01 157.6 144.2 113.9
52.05 153.9 143.6 114.1
52.09 151.8 142.4 114.3
52.14 150.4 141.9 114.6
52.18 150.2 142.3 114.8
52.22 151.8 143.9 115.1
52.26 155.2 147.1 115.4
52.30 151.4 [illegible] 115.7
52.34 167.5 160.0 115.9
52.39 161.4 152.7 116.1
52.43 157.3 148.1 116.2
52.47 153.9 145.8 116.3
52.51 152.5 [illegible] 116.4
52.55 153.4 145.1 116.6
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
52.64 156.4 149.9 117.0
52.68 159.1 154.3 117.4
52.72 161.4 161.1 117.7
52.76 157.5 150.5 118.0
52.80 153.6 145.2 118.3
52.84 150.4 142.0 118.6
52.89 148.1 139.9 118.7
52.93 146.6 138.4 118.8
52.97 145.7 137.4 118.8
53.01 145.3 136.9 118.8
53.05 145.1 136.6 118.7
53.09 144.8 136.6 118.6
53.14 144.6 136.9 118.5
53.18 145.3 137.5 118.4
53.22 146.5 138.3 118.2
53.26 146.8 139.1 118.1
53.30 146.6 139.6 118.0
53.34 146.8 139.7 117.9
53.39 146.8 139.1 117.9
53.43 145.6 138.1 118.0
53.47 144.3 137.2 118.2
53.51 144.5 136.5 118.5
53.55 145.1 135.6 118.9
53.59 143.6 134.7 119.3
53.64 141.8 133.8 119.9
53.68 141.6 133.1 120.5
53.72 141.6 132.5 121.5
53.76 140.7 132.2 122.4
53.80 140.3 132.1 123.3
53.84 141.4 132.1 124.5
53.89 141.8 132.1 125.8
53.93 140.4 131.9 126.6
53.97 140.3 131.9 127.5
54.01 141.8 131.9 129.1
54.05 141.3 131.6 130.2
54.09 139.2 131.2 130.6
54.14 138.8 131.3 131.5
54.18 140.7 131.7 133.1
54.22 142.7 132.4 133.9
54.26 141.8 132.7 134.4
54.30 141.1 132.8 135.7
54.34 142.0 133.2 137.1
54.39 143.5 133.9 136.4
54.43 144.3 134.4 134.8
54.47 144.2 134.5 133.9
54.51 143.8 134.3 133.2
54.55 143.0 133.8 132.4
54.59 142.2 133.3 131.6
54.64 141.5 132.8 131.2
54.68 140.9 132.4 131.4
54.72 140.5 132.2 132.0
54.76 140.4 132.2 133.2
54.80 140.8 132.6 134.8
54.84 141.5 133.3 136.8
54.89 142.8 134.4 139.1
54.93 144.7 136.3 141.1
54.97 147.6 137.9 140.4
55.01 151.0 139.8 138.2
55.05 151.9 140.6 136.0
55.09 150.1 140.1 134.6
55.14 148.7 139.4 132.8
55.18 148.2 138.8 130.3
55.22 147.8 138.2 128.7
55.26 147.0 137.7 127.2
55.30 146.5 137.2 126.0
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FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

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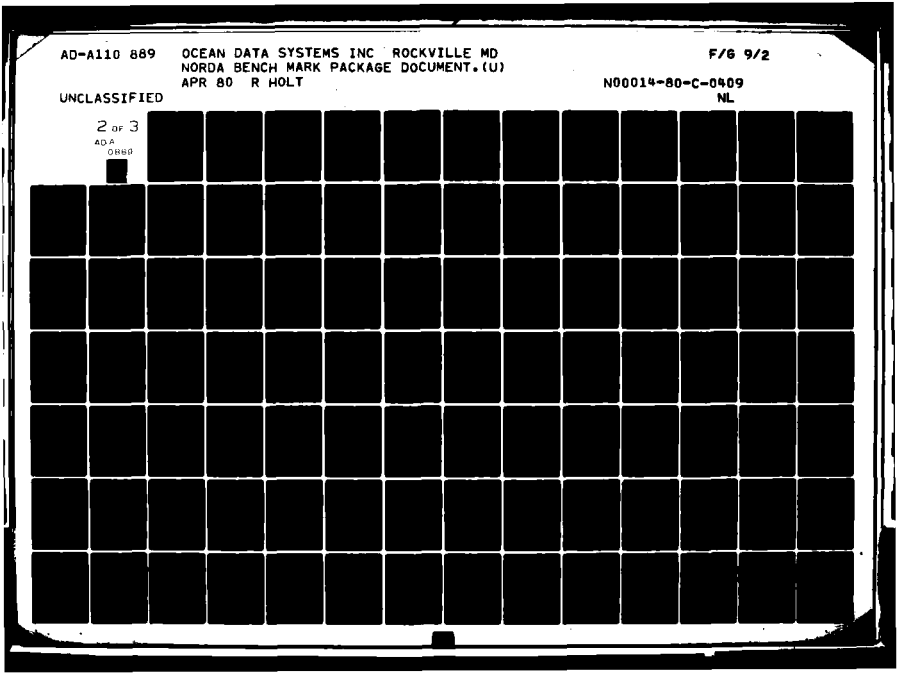

55.40	145.3	135.9	124.3
55.45	143.7	135.0	123.6
55.51	143.3	134.6	123.3
55.56	143.7	134.7	123.1
55.61	144.2	135.1	123.4
55.67	145.1	135.6	122.9
55.72	145.8	135.8	123.0
55.77	144.9	135.4	123.1
55.83	143.8	135.9	123.2
55.88	143.6	134.9	123.5
55.95	144.8	135.6	123.9
56.02	146.1	136.7	124.7
56.09	147.5	137.6	125.6
56.16	147.9	137.8	126.5
56.23	146.2	137.1	127.3
56.33	145.8	136.6	128.9
56.42	145.0	136.6	131.1
56.52	147.3	138.1	133.7
56.61	149.1	139.2	136.7
56.70	147.4	136.7	139.3
56.85	148.3	139.6	137.7
57.01	149.1	140.5	135.1
57.16	148.9	139.3	132.6
57.31	149.0	139.1	132.4
57.46	151.0	140.3	132.9
57.68	147.5	138.0	133.1
57.90	152.3	139.8	133.3
58.11	147.2	138.8	133.6
58.33	149.2	141.7	137.7
58.55	154.6	145.7	138.1
58.76	155.3	149.8	135.4
58.98	149.3	143.8	135.4
59.20	149.3	142.2	137.1
59.41	156.6	145.3	151.1
59.63	156.6	145.5	142.9
59.85	147.5	140.0	147.5
60.06	151.9	143.1	146.7
60.28	149.3	148.5	140.1
60.50	146.9	143.5	136.6
60.72	140.0	138.8	133.5
60.93	133.7	135.9	141.2
61.15	146.8	134.8	129.1
61.37	127.6	128.8	125.9
61.58	123.3	126.3	120.3
61.80	120.8	125.6	121.3
62.02	121.2	122.5	122.2
62.23	124.4	120.5	119.2
62.45	120.2	118.1	116.2
62.67	119.0	114.4	118.3
62.88	145.6	118.8	112.6
63.10	116.6	110.3	104.9
63.32	127.0	115.6	104.0
63.54	114.3	111.0	108.9
63.75	114.4	108.2	108.7
63.97	122.9	115.1	106.6
64.26	126.8	118.7	117.3
64.56	114.6	114.7	115.6
64.85	119.6	115.2	114.4
65.14	123.5	116.4	119.4
65.43	126.9	123.5	114.0
65.73	121.1	114.9	112.4
66.02	131.4	124.7	115.9
66.31	136.4	127.9	118.4
66.61	135.8	129.0	120.8
66.90	132.9	125.4	118.7

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

```
67.23 133.7 125.8 120.2
67.40 136.0 133.4 123.5
67.57 134.6 127.6 126.1
67.73 137.5 130.7 126.4
67.90 142.2 136.6 130.6
68.06 145.1 135.1 125.6
68.23 140.1 137.3 126.6
68.40 136.0 131.6 124.5
64.56 139.6 135.7 126.6
68.73 140.5 138.3 136.8
68.90 145.2 141.7 129.0
69.06 138.2 135.1 129.7
69.23 146.3 144.1 131.1
69.40 148.4 150.4 132.8
69.56 141.3 137.7 130.6
69.73 141.1 135.9 136.2
69.89 140.3 136.6 136.9
70.06 138.2 131.4 133.3

--- PROGRAM  NEW PE  TERMINATED NORMALLY ---
```

FIGURE 6: EXPECTED NEWPE OUTPUT (continued)

IV.7 Site Dependent Software

NEWPE contains FORTRAN code which may be site dependent. This code is in the form of a call to system subroutine DATE which is not included in the PL provided in this package. This call involves the FORTRAN interface with the Operating System at DTNSRDC and is made to retrieve the current month, day, and year. It is possible that this subroutine may have a different name and/or argument list at the bench mark site. *Table VI lists the exact location in* NEWPE at which DATE is called.

If the call to DATE is inappropriate at the bench mark site, the following course of action is recommended to modify the execution deck:

1. Determine the appropriate subroutine call and argument list to retrieve the current date.

2. Prepare the necessary update cards to delete the existing call statement and replace it with the proper call. Certify that names given to variables in the update are consistent with existing names. To assist the user in this, Section IV.7.1 reproduces the call statement exactly as it appears in the FORTRAN compilation listing, and describes the call list. Additionally, Appendix F contains the complete compilation listing of the subroutine that calls DATE, and Appendix C contains user level documentation for DATE.

3. Insert update cards in the NEWPE execution deck. For every PL on *the program tape accessed by* UPDATE *there is* a "7/8/9" card in the execution deck to satisfy the UPDATE command. Each of these "7/8/9" cards is annotated with the name of a PL. Insert the update cards immediately following the "7/8/9" card with the annotation "NEWPE updates follow this card."

TABLE VI: LOCATION OF POSSIBLE SITE DEPENDENT SOFTWARE IN NEWPE

Possible Site Dependent Subroutine	PL or Program Name	Program Element	Line No.	Line ID
DATE	NEWPE	SUBROUTINE PETL	235	AESD.42

IV.7.1 DATE references

FORTRAN Statement: Line ID:

CALL DATE (WHEN) AESD 42

Argument List:

WHEN — Integer in which the date is returned in the format 10Hbmm/dd/yyb (b represents a blank character).

V. SYNACC

V.1 General Information

SYNACC is a batch mode program consisting of a single executable module referenced as SYNACC in the execution deck. SYNACC contains calls to CalComp subroutines PLOTS, PLOT, AXIS, NUMBER, and SYMBOL; however, in the bench mark run the "plot flag" is off and these calls are not executed. (They may be listed as unsatisfied external references when the program is loaded.) SYNACC is coded entirely in FORTRAN IV.

V.2 Location of Program

Program SYNACC is provided as a FORTRAN punched card deck within the execution deck. The program tape is not needed for SYNACC.

V.3 Job Stream

The job stream included in the SYNACC execution deck and listed in Section V.5 with comments performs the following basic functions: mounts data tape CK0456, copies seven data files from tape to mass storage and catalogs each file, compiles SYNACC from cards, then loads and executes it, and finally purges the seven data files. Job stream commands shown are those used on the DTNSRDC CDC 6600/6700 system. Note that the library file NSRDC is attached and included in the load. This file contains subroutines UNLOAD and ZPFUNC (see Section V.7) which are referenced within SYNACC. This file reference will certainly need to be changed at the bench mark site.

V.4 Input

SYNACC requires input from cataloged data files. The specific files and number of files varies from run to run depending on the card input which is also required. For each execution, SYNACC determines which data files are needed, then attaches and reads them one at a time from within the FORTRAN code. The necessary data files must be cataloged with the expected names. The SYNACC data tape, CK0456, and the backup tape, CK0152, contain seven data files which satisfy the program for the bench mark execution. All necessary data cards are contained in the SYNACC execution deck and are listed in Section V.5.

V.5 Execution Deck

A listing of the SYNACC execution deck is presented in Figure 7 followed by comments. The entire SYNACC program which is included in the execution deck has been omitted from the listing. Numbers opposite card images in the figure coincide with the appropriate comment number. Job stream commands and data are identical to those which produced the output in Section V.6 on the CDC 6600/6700 system at DTNSRDC.

Comment Number:	Card Image
1 -	VSN,SYNDAT=CK0456.
2 -	REQUEST,SYNDAT,HY,NORING. /CK0456/NORING/
3 -	REQUEST,GRID,*PF.
4 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1111,ID=PVRV.
6 -	RETURN,GRID.
3 -	REQUEST,GRID,*PF.
7 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1112,ID=PVRV.
6 -	RETURN,GRID.
3 -	REQUEST,GRID,*PF.
8 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1121,ID=PVRV.
6 -	RETURN,GRID.
3 -	REQUEST,GRID,*PF.
9 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1122,ID=PVRV.
6 -	RETURN,GRID.
3 -	REQUEST,GRID,*PF.
10 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1131,ID=PVRV.
6 -	RETURN,GRID.
3 -	REQUEST,GRID,*PF.
11 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1132,ID=PVRV.
6 -	RETURN,GRID.
3 -	REQUEST,GRID,*PF.
12 -	COPYCF,SYNDAT,GRID.
5 -	CATALOG,GRID,FINALGRID1141,ID=PVRV.
6 -	RETURN,GRID.
13 -	UNLOAD,SYNDAT.
14 -	FTN,L=0,OPT=2,B=SYNACC.
15 -	ATTACH,NSRDC.
16 -	LIBRARY,NSRDC.
17 -	LDSET,PRESET=NGINF.
18 -	SYNACC.
19 -	EXIT,U.
20 -	UNLOAD,TAPE1.
21 -	ATTACH,TEMP,FINALGRID1111,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
21 -	ATTACH,TEMP,FINALGRID1112,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
21 -	ATTACH,TEMP,FINALGRID1121,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
21 -	ATTACH,TEMP,FINALGRID1122,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
21 -	ATTACH,TEMP,FINALGRID1131,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
21 -	ATTACH,TEMP,FINALGRID1132,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
21 -	ATTACH,TEMP,FINALGRID1141,ID=PVRV.
22 -	PURGE,TEMP.
22 -	RETURN,TEMP.
*23 -	7/8/9 END OF RECORD CARD

FIGURE 7: SYNACC EXECUTION DECK

Comment Number:	Card Image								
24 -	PROGRAM ACCESS(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1,								ACCESS 2
25 -									
25 -									
25 -	SYNACC FORTRAN PUNCHED CARD DECK								
25 -									
25 -									
26 -	END								SYNPL279
* 27 -	7/8/9 END OF RECORD CARD								
28 -	2 BEARINGS T								
28 -	NORDA BENCH MARK TRACK 1		30	N	50	W	80.	1500.	
28 -	NORDA BENCH MARK TRACK 2		32	N	23	W	275.	1000.	
28 -	99999999								
28 -	50. 250. METERS 24.								NOPLOT
** 29 -	6/7/8/9 END OF JOB CARD								

* This image represents a card with a 7/8/9 multi-punch in Col. 1.

** This image represents a card with a 6/7/8/9 multi-punch in Col. 1.

FIGURE 7: SYNACC EXECUTION DECK (continued)

The following comments refer to card images in the SYNACC execution deck listed in Figure 7.

Comment Number:	Comment:
1	Specify data and program tapes to be used.
2	Mount unlabeled data tape with local file name SYNDAT. Density = 800 BPI (HY). No write ring.
3	Request permanent file space for purpose of cataloging.
4	Copy 1st coded file from tape to permanent file space.
5	Catalog the file with name and ID shown.
6	Release the cataloged file. SYNACC attaches files internally when they are needed.
7	Copy 2nd coded file from tape to permanent file space.
8	Copy 3rd coded file from tape to permanent file space.
9	Copy 4th coded file from tape to permanent file space.
10	Copy 5th coded file from tape to permanent file space.

Comment Number:	Comment:
11	Copy 6th coded file from tape to permanent file space.
12	Copy 7th coded file from tape to permanent file space.
13	Data tape no longer needed.
14	Create the binary file SYNACC from cards.
15	This is a DTNSRDC binary library containing subroutines UNLOAD and ZPFUNC (see Section V.7).
16	Include NSRDC when loading.
17	Preset values in core to negative infinity with the address of the word set in the low order bits.
18	Load and execute SYNACC. All system routines needed to complete the executable module (except UNLOAD and ZPFUNC) are in system libraries that are automatically included by the loader.
19	Control reaches this card unconditionally.
20	Release the cataloged data file last attached in the SYNACC execution.
21	Attach the file name shown for the purpose of purging.
22	Purge the file just attached.
23	Program SYNACC follows this card.
24	First card of program SYNACC.
25	SYNACC FORTRAN program cards. (Actual card images are not listed).
26	Last card of program SYNACC.
27	Data for SYNACC follow this card.
28	SYNACC data cards.
29	End of deck.

V.6 Output

The expected output from running the SYNACC execution deck is listed in Figure 8.

NORDA ENVIRONMENTAL INFORMATION SYSTEM

A SYNTHETIC BATHYMETRIC PROFILE ALONG A GREAT CIRCLE PATH
FOR REQUEST "NORDA BENCH MARK TRACK 1 "

RANGE AND 5-DEGREE SQUARE TABLE

LATITUDE	LONGITUDE	BEARING	RANGE(N.M.)	MSQLOC
30. 0. N	50. 0. W	80.000	0.	1141
30. 0. N	49.59. W	80.009	1.	1132
30.40. N	45. 1. W	82.517	261.	1132
30.40. N	45. 0. W	82.527	262.	1131
31. 8. N	40. 1. W	85.086	520.	1131
31. 8. N	40. 0. W	85.096	521.	1122
31.24. N	35. 1. W	87.683	777.	1122
31.24. N	35. 0. W	87.693	778.	1121
31.28. N	30. 1. W	90.292	1033.	1121
31.28. N	30. 0. W	90.302	1034.	1112
31.21. N	25. 1. W	92.898	1289.	1112
31.21. N	25. 0. W	92.908	1290.	1111
31. 7. N	20.55. W	95.027	1500.	1111

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
ATTACH,TAPE1,FINALGRID1141,ID=PVRV,CY=3.
THE ATTACHED SYNBAPS FILE HAS HEADER DATA- MSQS=1141 ICOL=63 IROW= 74
THERE ARE 1 POINTS DEFINING A 0.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1141. THIS PROFILE NOW HAS 1 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
ATTACH,TAPE1,FINALGRID1132,ID=PVRV,CY=3.
THE ATTACHED SYNBAPS FILE HAS HEADER DATA- MSQS=1132 ICOL=63 IROW= 74
THERE ARE 261 POINTS DEFINING A 260.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1132. THIS PROFILE NOW HAS 262 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
ATTACH,TAPE1,FINALGRID1131,ID=PVRV,CY=3.
THE ATTACHED SYNBAPS FILE HAS HEADER DATA- MSQS=1131 ICOL=63 IROW= 74
THERE ARE 259 POINTS DEFINING A 258.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1131. THIS PROFILE NOW HAS 521 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
ATTACH,TAPE1,FINALGRID1122,ID=PVRV,CY=3.
THE ATTACHED SYNBAPS FILE HAS HEADER DATA- MSQS=1122 ICOL=63 IROW= 74
THERE ARE 257 POINTS DEFINING A 256.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1122. THIS PROFILE NOW HAS 778 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
ATTACH,TAPE1,FINALGRID1121,ID=PVRV,CY=3.
THE ATTACHED SYNBAPS FILE HAS HEADER DATA- MSQS=1121 ICOL=63 IROW= 74
THERE ARE 256 POINTS DEFINING A 255.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1121. THIS PROFILE NOW HAS 1034 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
ATTACH,TAPE1,FINALGRID1112,ID=PVRV,CY=3.
THE ATTACHED SYNBAPS FILE HAS HEADER DATA- MSQS=1112 ICOL=63 IROW= 74
THERE ARE 256 POINTS DEFINING A 255.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1112. THIS PROFILE NOW HAS 1290 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-

FIGURE 8: EXPECTED SYNACC OUTPUT

```
THE ATTACHED SYNHAPS FILE HAS HEADER DATA-  MSOS=1111   JCOL=63   INOW= 74
THERE ARE 211 POINTS DEFINING A  210.0 NAUTICAL MILE TRACK TRAVERSING MSULOC=1111. THIS PROFILE NOW HAS  1501 POINTS.

THIS COMPLETES PROFILE NUMBER   1 (REQUEST "NOKOA BENCH MAP TRACK 1                  ")
```

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

```
                    NORDA ENVIRONMENTAL INFORMATION SYSTEM

A SYNTHETIC BATHYMETRIC PROFILE ALONG A GREAT CIRCLE PATH
FOR REQUEST "NORDA BENCH MARK TRACK 2                    "

                    RANGE AND 5-DEGREE SQUARE TABLE

LATITUDE  LONGITUDE      BEARING        RANGE(N.M.) MSQLOC

32. 0. N   23. 0. W      275.000            0.       1111
32. 8. N   25. 0. W      273.938          102.       1111
32. 8. N   25. 1. W      273.928          103.       1112
32.14. N   30. 0. W      271.271          356.       1112
32.20. N   30. 1. W      271.260          357.       1121
32.19. N   34.59. W      268.601          609.       1121
32.19. N   35. 1. W      268.591          610.       1122
32. 7. N   39.59. W      265.935          863.       1122
32. 7. N   40. 0. W      265.924          864.       1131
31.56. N   42.40. W      264.512         1000.       1131

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
        ATTACH,TAPE1,FINALGRID1111,ID=PVRV,CY=3.
THE ATTACHED SYNRAPS FILE HAS HEADER DATA-  MSQS=1111   ICOL=63   IROW= 74
THERE ARE 103 POINTS DEFINING A  102.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1111. THIS PROFILE NOW HAS   103 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
        ATTACH,TAPE1,FINALGRID1112,ID=PVRV,CY=3.
THE ATTACHED SYNRAPS FILE HAS HEADER DATA-  MSQS=1112   ICOL=63   IROW= 74
THERE ARE 254 POINTS DEFINING A  253.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1112. THIS PROFILE NOW HAS   357 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
        ATTACH,TAPE1,FINALGRID1121,ID=PVRV,CY=3.
THE ATTACHED SYNRAPS FILE HAS HEADER DATA-  MSQS=1121   ICOL=63   IROW= 74
THERE ARE 253 POINTS DEFINING A  252.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1121. THIS PROFILE NOW HAS   610 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
        ATTACH,TAPE1,FINALGRID1122,ID=PVRV,CY=3.
THE ATTACHED SYNRAPS FILE HAS HEADER DATA-  MSQS=1122   ICOL=63   IROW= 74
THERE ARE 254 POINTS DEFINING A  253.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1122. THIS PROFILE NOW HAS   864 POINTS.

THE FOLLOWING ATTACH HAS BEEN PERFORMED-
        ATTACH,TAPE1,FINALGRID1131,ID=PVRV,CY=3.
THE ATTACHED SYNRAPS FILE HAS HEADER DATA-  MSQS=1131   ICOL=63   IROW= 74
THERE ARE 137 POINTS DEFINING A  136.0 NAUTICAL MILE TRACK TRAVERSING MSQLOC=1131. THIS PROFILE NOW HAS  1001 POINTS.

THIS COMPLETES PROFILE NUMBER   2 (REQUEST "NORDA BENCH MARK TRACK 2                    "
```

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

PROFILE NUMBER 12 BATHYMETRY IS IN METERS FOR "NORDA BENCH MARK TRACK 1 ".
THERE ARE 1501 PAIRS OF PROFILE POINTS (RANGE,DEPTH) OUT TO 1500 NAUTICAL MILES.

0.	5285.	1.	5287.	2.	5281.	3.	5271.
4.	5261.	5.	5255.	6.	5253.	7.	5253.
8.	5255.	9.	5256.	10.	5256.	11.	5254.
12.	5252.	13.	5248.	14.	5243.	15.	5237.
16.	5233.	17.	5230.	18.	5229.	19.	5230.
20.	5230.	21.	5226.	22.	5215.	23.	5196.
24.	5171.	25.	5141.	26.	5110.	27.	5079.
28.	5051.	29.	5028.	30.	5011.	31.	5002.
32.	5000.	33.	5001.	34.	5002.	35.	4998.
36.	4986.	37.	4969.	38.	4949.	39.	4929.
40.	4912.	41.	4897.	42.	4882.	43.	4866.
44.	4847.	45.	4827.	46.	4813.	47.	4813.
48.	4835.	49.	4882.	50.	4938.	51.	4983.
52.	4994.	53.	4954.	54.	4864.	55.	4745.
56.	4619.	57.	4506.	58.	4420.	59.	4362.
60.	4329.	61.	4320.	62.	4332.	63.	4356.
64.	4383.	65.	4400.	66.	4399.	67.	4382.
68.	4369.	69.	4378.	70.	4427.	71.	4525.
72.	4649.	73.	4773.	74.	4868.	75.	4913.
76.	4913.	77.	4887.	78.	4857.	79.	4841.
80.	4848.	81.	4869.	82.	4895.	83.	4915.
84.	4924.	85.	4925.	86.	4922.	87.	4922.
88.	4928.	89.	4941.	90.	4956.	91.	4969.
92.	4977.	93.	4975.	94.	4963.	95.	4939.
96.	4903.	97.	4854.	98.	4803.	99.	4764.
100.	4749.	101.	4771.	102.	4826.	103.	4899.
104.	4973.	105.	5033.	106.	5068.	107.	5080.
108.	5073.	109.	5051.	110.	5016.	111.	4967.
112.	4902.	113.	4817.	114.	4711.	115.	4590.
116.	4471.	117.	4370.	118.	4306.	119.	4287.
120.	4300.	121.	4328.	122.	4356.	123.	4368.
124.	4362.	125.	4346.	126.	4325.	127.	4307.
128.	4293.	129.	4283.	130.	4275.	131.	4268.
132.	4260.	133.	4251.	134.	4241.	135.	4228.
136.	4213.	137.	4194.	138.	4172.	139.	4145.
140.	4112.	141.	4076.	142.	4042.	143.	4017.
144.	4008.	145.	4019.	146.	4049.	147.	4093.
148.	4148.	149.	4210.	150.	4272.	151.	4329.
152.	4376.	153.	4407.	154.	4418.	155.	4416.
156.	4407.	157.	4397.	158.	4392.	159.	4393.
160.	4396.	161.	4400.	162.	4403.	163.	4404.
164.	4403.	165.	4399.	166.	4394.	167.	4387.
168.	4382.	169.	4378.	170.	4380.	171.	4387.
172.	4398.	173.	4404.	174.	4399.	175.	4377.
176.	4337.	177.	4285.	178.	4229.	179.	4174.
180.	4129.	181.	4095.	182.	4074.	183.	4069.
184.	4080.	185.	4103.	186.	4128.	187.	4145.
188.	4145.	189.	4122.	190.	4082.	191.	4032.
192.	3977.	193.	3924.	194.	3877.	195.	3836.
196.	3806.	197.	3788.	198.	3785.	199.	3799.
200.	3830.	201.	3882.	202.	3955.	203.	4041.
204.	4135.	205.	42[illegible].	206.	4322.	207.	4403.
208.	4470.	209.	45[illegible].	210.	4542.	211.	4545.
212.	4532.	213.	4511.	214.	4490.	215.	4474.
216.	4463.	217.	4452.	218.	4441.	219.	4427.
220.	4410.	221.	4393.	222.	4377.	223.	4366.
224.	4359.	225.	4357.	226.	4358.	227.	4361.
228.	4370.	229.	4379.	230.	4390.	231.	4403.
232.	4418.	233.	4432.	234.	4440.	235.	4437.

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

240.	4264.	241.	4254.	242.	4261.	243.	4271.
244.	4295.	245.	4308.	246.	4315.	247.	4314.
248.	4327.	249.	4341.	250.	4366.	251.	4395.
252.	4424.	253.	4445.	254.	4454.	255.	4450.
256.	4435.	257.	4412.	258.	4382.	259.	4348.
260.	4310.	261.	4269.	262.	4231.	263.	4237.
264.	4228.	265.	4191.	266.	4112.	267.	3981.
268.	3811.	269.	3611.	270.	3470.	271.	3354.
272.	3293.	273.	3271.	274.	3269.	275.	3272.
276.	3266.	277.	3256.	278.	3250.	279.	3254.
280.	3277.	281.	3315.	282.	3362.	283.	3413.
284.	3461.	285.	3503.	286.	3534.	287.	3553.
288.	3557.	289.	3546.	290.	3527.	291.	3508.
292.	3498.	293.	3505.	294.	3525.	295.	3551.
296.	3577.	297.	3596.	298.	3607.	299.	3612.
300.	3616.	301.	3620.	302.	3627.	303.	3637.
304.	3649.	305.	3663.	306.	3677.	307.	3693.
308.	3711.	309.	3730.	310.	3753.	311.	3778.
312.	3805.	313.	3831.	314.	3862.	315.	3890.
316.	3915.	317.	3932.	318.	3940.	319.	3935.
320.	3919.	321.	3896.	322.	3868.	323.	3839.
324.	3810.	325.	3784.	326.	3761.	327.	3744.
328.	3732.	329.	3720.	330.	3705.	331.	3680.
332.	3645.	333.	3604.	334.	3563.	335.	3531.
336.	3512.	337.	3504.	338.	3499.	339.	3487.
340.	3459.	341.	3415.	342.	3365.	343.	3320.
344.	3290.	345.	3282.	346.	3285.	347.	3286.
348.	3272.	349.	3230.	350.	3172.	351.	3120.
352.	3095.	353.	3119.	354.	3192.	355.	3286.
356.	3373.	357.	3424.	358.	3422.	359.	3383.
360.	3332.	361.	3290.	362.	3279.	363.	3286.
364.	3286.	365.	3255.	366.	3168.	367.	3033.
368.	2892.	369.	2787.	370.	2763.	371.	2836.
372.	2966.	373.	3100.	374.	3185.	375.	3180.
376.	3101.	377.	2991.	378.	2892.	379.	2842.
380.	2851.	381.	2898.	382.	2962.	383.	3020.
384.	3061.	385.	3086.	386.	3102.	387.	3115.
388.	3130.	389.	3149.	390.	3172.	391.	3202.
392.	3237.	393.	3266.	394.	3266.	395.	3216.
396.	3092.	397.	2900.	398.	2687.	399.	2512.
400.	2428.	401.	2475.	402.	2619.	403.	2803.
404.	2973.	405.	3075.	406.	3104.	407.	3085.
408.	3045.	409.	3009.	410.	2992.	411.	2988.
412.	2991.	413.	2993.	414.	2986.	415.	2956.
416.	2888.	417.	2769.	418.	2586.	419.	2370.
420.	2176.	421.	2062.	422.	2080.	423.	2234.
424.	2452.	425.	2657.	426.	2772.	427.	2750.
428.	2634.	429.	2490.	430.	2381.	431.	2367.
432.	2445.	433.	2581.	434.	2745.	435.	2901.
436.	3031.	437.	3126.	438.	3182.	439.	3192.
440.	3156.	441.	3094.	442.	3027.	443.	2975.
444.	2956.	445.	2962.	446.	2969.	447.	2956.
448.	2901.	449.	2803.	450.	2679.	451.	2549.
452.	2431.	453.	2319.	454.	2273.	455.	2229.
456.	2206.	457.	2200.	458.	2218.	459.	2265.
460.	2350.	461.	2478.	462.	2634.	463.	2780.
464.	2883.	465.	2904.	466.	2834.	467.	2716.
468.	2600.	469.	2536.	470.	2561.	471.	2653.
472.	2767.	473.	2860.	474.	2891.	475.	2860.
476.	2801.	477.	2748.	478.	2735.	479.	2780.
480.	2865.	481.	2972.	482.	3080.	483.	3175.
484.	3251.	485.	3311.	486.	3354.	487.	3382.
488.	3396.	489.	3398.	490.	3391.	491.	3378.
492.	3354.	493.	3332.	494.	3296.	495.	3249.
496.	3191.	497.	3132.	498.	3087.	499.	3066.

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

504.	3356.	505.	3420.	506.	3468.	507.	3497.
508.	3504.	509.	3489.	510.	3463.	511.	3441.
512.	3436.	513.	3460.	514.	3507.	515.	3559.
516.	3599.	517.	3612.	518.	3592.	519.	3545.
520.	3480.	521.	3408.	522.	3330.	523.	3266.
524.	3212.	525.	3189.	526.	3201.	527.	3238.
528.	3285.	529.	3327.	530.	3351.	531.	3354.
532.	3345.	533.	3332.	534.	3324.	535.	3325.
536.	3333.	537.	3344.	538.	3356.	539.	3364.
540.	3358.	541.	3328.	542.	3263.	543.	315 .
544.	3022.	545.	2896.	546.	2807.	547.	2780.
548.	2835.	549.	2918.	550.	3001.	551.	3045.
552.	3031.	553.	2981.	554.	2920.	555.	2877.
556.	2875.	557.	2906.	558.	2955.	559.	3004.
560.	3017.	561.	3049.	562.	3040.	563.	3012.
564.	2967.	565.	2910.	566.	2858.	567.	2825.
568.	2828.	569.	2875.	570.	2947.	571.	3020.
572.	3069.	573.	3072.	574.	3034.	575.	2974.
576.	2911.	577.	2862.	578.	2836.	579.	2828.
580.	2834.	581.	2848.	582.	2865.	583.	2876.
584.	2875.	585.	2851.	586.	2802.	587.	2755.
588.	2744.	589.	2805.	590.	2970.	591.	3220.
592.	3498.	593.	3744.	594.	3901.	595.	3948.
596.	3921.	597.	3861.	598.	3809.	599.	3795.
600.	3814.	601.	3852.	602.	3894.	603.	3928.
604.	3950.	605.	3960.	606.	3960.	607.	3950.
608.	3931.	609.	3902.	610.	3863.	611.	3816.
612.	3764.	613.	3718.	614.	3691.	615.	3694.
616.	3735.	617.	3800.	618.	3867.	619.	3914.
620.	3921.	621.	3891.	622.	3842.	623.	3796.
624.	3763.	625.	3758.	626.	3769.	627.	3786.
628.	3798.	629.	3799.	630.	3792.	631.	3783.
632.	3777.	633.	3779.	634.	3789.	635.	3799.
636.	3808.	637.	3809.	638.	3803.	639.	3794.
640.	3789.	641.	3790.	642.	3801.	643.	3816.
644.	3828.	645.	3832.	646.	3824.	647.	3807.
648.	3790.	649.	3780.	650.	3783.	651.	3800.
652.	3825.	653.	3853.	654.	3879.	655.	3900.
656.	3915.	657.	3924.	658.	3925.	659.	3919.
660.	3911.	661.	3906.	662.	3909.	663.	3923.
664.	3942.	665.	3955.	666.	3953.	667.	3925.
668.	3873.	669.	3809.	670.	3747.	671.	3708.
672.	3676.	673.	3668.	674.	3672.	675.	3682.
676.	3692.	677.	3706.	678.	3725.	679.	3753.
680.	3792.	681.	3840.	682.	3890.	683.	3935.
684.	3967.	685.	3986.	686.	3997.	687.	4004.
688.	4014.	689.	4029.	690.	4044.	691.	4051.
692.	4045.	693.	4021.	694.	3991.	695.	3970.
696.	3975.	697.	4023.	698.	4099.	699.	4169.
700.	4195.	701.	4141.	702.	3997.	703.	3802.
704.	3601.	705.	3437.	706.	3344.	707.	3313.
708.	3324.	709.	3358.	710.	3397.	711.	3434.
712.	3472.	713.	3511.	714.	3552.	715.	3598.
716.	3646.	717.	3698.	718.	3752.	719.	3810.
720.	3869.	721.	3928.	722.	3988.	723.	4044.
724.	4085.	725.	4091.	726.	4046.	727.	3934.
728.	3777.	729.	3622.	730.	3521.	731.	3521.
732.	3636.	733.	3812.	734.	3993.	735.	4121.
736.	4155.	737.	4119.	738.	4050.	739.	3985.
740.	3957.	741.	3965.	742.	3991.	743.	4014.
744.	4017.	745.	3994.	746.	3957.	747.	3919.
748.	3892.	749.	3881.	750.	3889.	751.	3906.
752.	3929.	753.	3954.	754.	3974.	755.	4000.
756.	4016.	757.	4025.	758.	4029.	759.	4032.
760.	4038.	761.	4052.	762.	4075.	763.	4100.

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

768.	4112.	769.	4101.	770.	4095.	771.	4094.
772.	4096.	773.	4098.	774.	4096.	775.	4091.
776.	4084.	777.	4075.	778.	4068.	779.	4067.
780.	4066.	781.	4066.	782.	4065.	783.	4063.
784.	4062.	785.	4060.	786.	4059.	787.	4058.
788.	4058.	789.	4058.	790.	4058.	791.	4056.
792.	4053.	793.	4051.	794.	4052.	795.	4058.
796.	4068.	797.	4076.	798.	4077.	799.	4064.
800.	4033.	801.	3996.	802.	3971.	803.	3974.
804.	4022.	805.	4107.	806.	4202.	807.	4280.
808.	4316.	809.	4301.	810.	4252.	811.	4188.
812.	4132.	813.	4096.	814.	4081.	815.	4082.
816.	4095.	817.	4116.	818.	4143.	819.	4173.
820.	4204.	821.	4235.	822.	4258.	823.	4265.
824.	4247.	825.	4195.	826.	4111.	827.	4017.
828.	3936.	829.	3893.	830.	3903.	831.	3947.
832.	3999.	833.	4031.	834.	4019.	835.	3970.
836.	3907.	837.	3850.	838.	3823.	839.	3831.
840.	3863.	841.	3905.	842.	3948.	843.	3980.
844.	4003.	845.	4015.	846.	4017.	847.	4010.
848.	3993.	849.	3969.	850.	3938.	851.	3901.
852.	3862.	853.	3825.	854.	3798.	855.	3783.
856.	3782.	857.	3791.	858.	3805.	859.	3819.
860.	3832.	861.	3853.	862.	3893.	863.	3960.
864.	4064.	865.	4187.	866.	4308.	867.	4402.
868.	4447.	869.	4443.	870.	4403.	871.	4339.
872.	4267.	873.	4199.	874.	4144.	875.	4114.
876.	4118.	877.	4160.	878.	4216.	879.	4259.
880.	4262.	881.	4202.	882.	4097.	883.	3983.
884.	3892.	885.	3859.	886.	3887.	887.	3951.
888.	4028.	889.	4092.	890.	4131.	891.	4156.
892.	4178.	893.	4211.	894.	4261.	895.	4322.
896.	4380.	897.	4424.	898.	4443.	899.	4440.
900.	4424.	901.	4405.	902.	4393.	903.	4390.
904.	4394.	905.	4400.	906.	4405.	907.	4406.
908.	4398.	909.	4378.	910.	4342.	911.	4290.
912.	4234.	913.	4191.	914.	4176.	915.	4206.
916.	4271.	917.	4351.	918.	4422.	919.	4464.
920.	4471.	921.	4456.	922.	4436.	923.	4424.
924.	4431.	925.	4451.	926.	4476.	927.	4498.
928.	4510.	929.	4515.	930.	4521.	931.	4535.
932.	4562.	933.	4598.	934.	4633.	935.	4655.
936.	4652.	937.	4621.	938.	4570.	939.	4510.
940.	4450.	941.	4398.	942.	4353.	943.	4314.
944.	4282.	945.	4253.	946.	4232.	947.	4220.
948.	4222.	949.	4239.	950.	4270.	951.	4307.
952.	4340.	953.	4363.	954.	4373.	955.	4372.
956.	4368.	957.	4365.	958.	4367.	959.	4372.
960.	4376.	961.	4377.	962.	4371.	963.	4362.
964.	4358.	965.	4367.	966.	4396.	967.	4440.
968.	4478.	969.	4492.	970.	4461.	971.	4379.
972.	4271.	973.	4166.	974.	4090.	975.	4066.
976.	4084.	977.	4125.	978.	4170.	979.	4201.
980.	4216.	981.	4223.	982.	4227.	983.	4237.
984.	4253.	985.	4271.	986.	4285.	987.	4292.
988.	4287.	989.	4279.	990.	4273.	991.	4278.
992.	4298.	993.	4322.	994.	4336.	995.	4323.
996.	4268.	997.	4181.	998.	4086.	999.	4006.
1000.	3966.	1001.	3974.	1002.	4008.	1003.	4047.
1004.	4069.	1005.	4060.	1006.	4028.	1007.	3988.
1008.	3953.	1009.	3936.	1010.	3935.	1011.	3944.
1012.	3954.	1013.	3970.	1014.	3978.	1015.	3983.
1016.	3986.	1017.	3988.	1018.	3992.	1019.	4001.
1020.	4019.	1021.	4050.	1022.	4094.	1023.	4146.
1024.	4194.	1025.	4229.	1026.	4244.	1027.	4239.

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

```
1032.  4198.  1033.  4194.  1034.  4199.  1035.  4200.
1036.  4201.  1037.  4202.  1038.  4202.  1039.  4201.
1040.  4201.  1041.  4200.  1042.  4199.  1043.  4197.
1044.  4200.  1045.  4201.  1046.  4202.  1047.  4203.
1048.  4204.  1049.  4205.  1050.  4206.  1051.  4207.
1052.  4209.  1053.  4209.  1054.  4207.  1055.  4202.
1056.  4192.  1057.  4178.  1058.  4161.  1059.  4144.
1060.  4127.  1061.  4112.  1062.  4098.  1063.  4085.
1064.  4074.  1065.  4065.  1066.  4055.  1067.  4045.
1068.  4032.  1069.  4016.  1070.  3992.  1071.  3959.
1072.  3912.  1073.  3850.  1074.  3776.  1075.  3699.
1076.  3625.  1077.  3560.  1078.  3502.  1079.  3435.
1080.  3346.  1081.  3221.  1082.  3048.  1083.  2820.
1084.  2531.  1085.  2174.  1086.  1754.  1087.  1316.
1088.   916.  1089.   611.  1090.   451.  1091.   443.
1092.   568.  1093.   806.  1094.  1138.  1095.  1529.
1096.  1924.  1097.  2268.  1098.  2507.  1099.  2613.
1100.  2622.  1101.  2577.  1102.  2522.  1103.  2493.
1104.  2488.  1105.  2493.  1106.  2493.  1107.  2476.
1108.  2437.  1109.  2374.  1110.  2289.  1111.  2181.
1112.  2058.  1113.  1936.  1114.  1830.  1115.  1757.
1116.  1724.  1117.  1708.  1118.  1681.  1119.  1619.
1120.  1503.  1121.  1385.  1122.  1339.  1123.  1441.
1124.  1760.  1125.  2251.  1126.  2777.  1127.  3198.
1128.  3378.  1129.  3276.  1130.  3011.  1131.  2714.
1132.  2519.  1133.  2519.  1134.  2675.  1135.  2919.
1136.  3184.  1137.  3407.  1138.  3572.  1139.  3686.
1140.  3755.  1141.  3785.  1142.  3785.  1143.  3770.
1144.  3753.  1145.  3748.  1146.  3761.  1147.  3790.
1148.  3829.  1149.  3873.  1150.  3918.  1151.  3960.
1152.  3998.  1153.  4029.  1154.  4050.  1155.  4064.
1156.  4073.  1157.  4081.  1158.  4089.  1159.  4100.
1160.  4113.  1161.  4128.  1162.  4143.  1163.  4159.
1164.  4175.  1165.  4189.  1166.  4200.  1167.  4209.
1168.  4215.  1169.  4222.  1170.  4229.  1171.  4240.
1172.  4253.  1173.  4268.  1174.  4283.  1175.  4298.
1176.  4312.  1177.  4324.  1178.  4336.  1179.  4348.
1180.  4359.  1181.  4371.  1182.  4383.  1183.  4396.
1184.  4409.  1185.  4423.  1186.  4438.  1187.  4452.
1188.  4467.  1189.  4481.  1190.  4496.  1191.  4509.
1192.  4522.  1193.  4534.  1194.  4546.  1195.  4559.
1196.  4573.  1197.  4589.  1198.  4608.  1199.  4627.
1200.  4647.  1201.  4667.  1202.  4687.  1203.  4707.
1204.  4727.  1205.  4747.  1206.  4767.  1207.  4788.
1208.  4809.  1209.  4831.  1210.  4855.  1211.  4878.
1212.  4901.  1213.  4923.  1214.  4943.  1215.  4962.
1216.  4980.  1217.  4998.  1218.  5016.  1219.  5034.
1220.  5054.  1221.  5073.  1222.  5094.  1223.  5114.
1224.  5133.  1225.  5150.  1226.  5162.  1227.  5170.
1228.  5175.  1229.  5179.  1230.  5184.  1231.  5193.
1232.  5204.  1233.  5215.  1234.  5226.  1235.  5233.
1236.  5238.  1237.  5241.  1238.  5243.  1239.  5244.
1240.  5247.  1241.  5249.  1242.  5252.  1243.  5255.
1244.  5259.  1245.  5262.  1246.  5265.  1247.  5267.
1248.  5268.  1249.  5268.  1250.  5267.  1251.  5265.
1252.  5262.  1253.  5259.  1254.  5256.  1255.  5254.
1256.  5254.  1257.  5257.  1258.  5262.  1259.  5266.
1260.  5270.  1261.  5273.  1262.  5274.  1263.  5275.
1264.  5276.  1265.  5278.  1266.  5280.  1267.  5282.
1268.  5285.  1269.  5287.  1270.  5289.  1271.  5291.
1272.  5293.  1273.  5295.  1274.  5297.  1275.  5299.
1276.  5302.  1277.  5304.  1278.  5307.  1279.  5309.
1280.  5312.  1281.  5313.  1282.  5313.  1283.  5312.
1284.  5311.  1285.  5309.  1286.  5309.  1287.  5309.
1288.  5310.  1289.  5311.  1290.  5312.  1291.  5313.
```

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

1296.	5303.	1297.	5295.	1298.	5288.	1299.	5284.
1300.	5282.	1301.	5281.	1302.	5282.	1303.	5282.
1304.	5282.	1305.	5281.	1306.	5280.	1307.	5279.
1308.	5278.	1309.	5277.	1310.	5276.	1311.	5275.
1312.	5274.	1313.	5273.	1314.	5272.	1315.	5271.
1316.	5271.	1317.	5270.	1318.	5269.	1319.	5268.
1320.	5267.	1321.	5266.	1322.	5266.	1323.	5265.
1324.	5264.	1325.	5263.	1326.	5262.	1327.	5261.
1328.	5260.	1329.	5259.	1330.	5258.	1331.	5257.
1332.	5257.	1333.	5256.	1334.	5255.	1335.	5254.
1336.	5254.	1337.	5253.	1338.	5252.	1339.	5251.
1340.	5250.	1341.	5249.	1342.	5249.	1343.	5248.
1344.	5247.	1345.	5246.	1346.	5246.	1347.	5245.
1348.	5244.	1349.	5243.	1350.	5242.	1351.	5241.
1352.	5240.	1353.	5239.	1354.	5238.	1355.	5237.
1356.	5237.	1357.	5236.	1358.	5235.	1359.	5235.
1360.	5234.	1361.	5233.	1362.	5232.	1363.	5231.
1364.	5230.	1365.	5229.	1366.	5229.	1367.	5228.
1368.	5227.	1369.	5226.	1370.	5225.	1371.	5224.
1372.	5223.	1373.	5222.	1374.	5221.	1375.	5221.
1376.	5220.	1377.	5219.	1378.	5218.	1379.	5217.
1380.	5217.	1381.	5216.	1382.	5215.	1383.	5214.
1384.	5213.	1385.	5212.	1386.	5211.	1387.	5210.
1388.	5209.	1389.	5208.	1390.	5207.	1391.	5206.
1392.	5205.	1393.	5205.	1394.	5204.	1395.	5204.
1396.	5204.	1397.	5202.	1398.	5200.	1399.	5197.
1400.	5194.	1401.	5190.	1402.	5185.	1403.	5181.
1404.	5176.	1405.	5171.	1406.	5167.	1407.	5162.
1408.	5156.	1409.	5154.	1410.	5150.	1411.	5145.
1412.	5141.	1413.	5137.	1414.	5132.	1415.	5128.
1416.	5124.	1417.	5120.	1418.	5115.	1419.	5111.
1420.	5106.	1421.	5102.	1422.	5097.	1423.	5093.
1424.	5088.	1425.	5084.	1426.	5080.	1427.	5076.
1428.	5071.	1429.	5067.	1430.	5063.	1431.	5059.
1432.	5054.	1433.	5050.	1434.	5046.	1435.	5041.
1436.	5037.	1437.	5033.	1438.	5028.	1439.	5024.
1440.	5019.	1441.	5015.	1442.	5011.	1443.	5007.
1444.	5003.	1445.	4998.	1446.	4994.	1447.	4989.
1448.	4984.	1449.	4979.	1450.	4974.	1451.	4969.
1452.	4964.	1453.	4960.	1454.	4955.	1455.	4950.
1456.	4946.	1457.	4941.	1458.	4936.	1459.	4932.
1460.	4927.	1461.	4923.	1462.	4918.	1463.	4914.
1464.	4910.	1465.	4906.	1466.	4902.	1467.	4898.
1468.	4894.	1469.	4890.	1470.	4886.	1471.	4882.
1472.	4878.	1473.	4874.	1474.	4870.	1475.	4867.
1476.	4864.	1477.	4860.	1478.	4857.	1479.	4853.
1480.	4850.	1481.	4846.	1482.	4843.	1483.	4839.
1484.	4837.	1485.	4834.	1486.	4833.	1487.	4832.
1488.	4832.	1489.	4832.	1490.	4833.	1491.	4833.
1492.	4833.	1493.	4833.	1494.	4832.	1495.	4831.
1496.	4831.	1497.	4830.	1498.	4829.	1499.	4828.
1500.	4827.						

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

PROFILE NUMBER 21 BATHYMETRY IS IN METERS FOR "HONDA BENCH MARK TRACK 2 ".
THERE ARE 1001 PAIRS OF PROFILE POINTS (RANGE,DEPTH) OUT TO 1000 NAUTICAL MILES.

0.	5206.	1.	5206.	2.	5207.	3.	5207.
4.	5208.	5.	5208.	6.	5208.	7.	5209.
8.	5209.	9.	5209.	10.	5209.	11.	5210.
12.	5210.	13.	5211.	14.	5211.	15.	5212.
16.	5212.	17.	5213.	18.	5213.	19.	5213.
20.	5214.	21.	5214.	22.	5214.	23.	5214.
24.	5215.	25.	5215.	26.	5215.	27.	5216.
28.	5216.	29.	5216.	30.	5217.	31.	5217.
32.	5217.	33.	5218.	34.	5218.	35.	5218.
36.	5219.	37.	5219.	38.	5219.	39.	5219.
40.	5220.	41.	5220.	42.	5220.	43.	5220.
44.	5221.	45.	5221.	46.	5222.	47.	5222.
48.	5222.	49.	5222.	50.	5222.	51.	5222.
52.	5222.	53.	5222.	54.	5223.	55.	5223.
56.	5223.	57.	5223.	58.	5224.	59.	5224.
60.	5224.	61.	5224.	62.	5224.	63.	5224.
64.	5224.	65.	5225.	66.	5225.	67.	5225.
68.	5226.	69.	5226.	70.	5226.	71.	5226.
72.	5226.	73.	5226.	74.	5226.	75.	5226.
76.	5227.	77.	5227.	78.	5227.	79.	5227.
80.	5226.	81.	5226.	82.	5226.	83.	5226.
84.	5226.	85.	5226.	86.	5227.	87.	5228.
88.	5228.	89.	5227.	90.	5224.	91.	5221.
92.	5220.	93.	5223.	94.	5231.	95.	5245.
96.	5261.	97.	5276.	98.	5285.	99.	5286.
100.	5283.	101.	5276.	102.	5267.	103.	5262.
104.	5260.	105.	5261.	106.	5266.	107.	5278.
108.	5292.	109.	5304.	110.	5309.	111.	5304.
112.	5288.	113.	5269.	114.	5253.	115.	5245.
116.	5248.	117.	5256.	118.	5264.	119.	5265.
120.	5256.	121.	5237.	122.	5209.	123.	5174.
124.	5134.	125.	5093.	126.	5056.	127.	5027.
128.	5011.	129.	5007.	130.	5011.	131.	5021.
132.	5031.	133.	5039.	134.	5042.	135.	5036.
136.	5020.	137.	4997.	138.	4965.	139.	4948.
140.	4951.	141.	4983.	142.	5034.	143.	5089.
144.	5133.	145.	5151.	146.	5148.	147.	5139.
148.	5139.	149.	5164.	150.	5207.	151.	5241.
152.	5234.	153.	5158.	154.	5005.	155.	4822.
156.	4662.	157.	4581.	158.	4616.	159.	4736.
160.	4890.	161.	5024.	162.	5095.	163.	5102.
164.	5075.	165.	5042.	166.	5032.	167.	5051.
168.	5088.	169.	5129.	170.	5160.	171.	5174.
172.	5178.	173.	5178.	174.	5181.	175.	5193.
176.	5208.	177.	5223.	178.	5232.	179.	5230.
180.	5218.	181.	5203.	182.	5188.	183.	5179.
184.	5176.	185.	5176.	186.	5175.	187.	5171.
188.	5161.	189.	5148.	190.	5132.	191.	5115.
192.	5099.	193.	5084.	194.	5071.	195.	5063.
196.	5058.	197.	5052.	198.	5041.	199.	5017.
200.	4976.	201.	4919.	202.	4851.	203.	4774.
204.	4708.	205.	4639.	206.	4564.	207.	4475.
208.	4364.	209.	4229.	210.	4083.	211.	3934.
212.	3814.	213.	3716.	214.	3617.	215.	3479.
216.	3266.	217.	2944.	218.	2541.	219.	2122.
220.	1751.	221.	1491.	222.	1343.	223.	1338.
224.	1388.	225.	1480.	226.	1593.	227.	1719.
228.	1853.	229.	1988.	230.	2119.	231.	2233.
232.	2318.	233.	2360.	234.	2349.	235.	2294.

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

240.	2029.	241.	2014.	242.	1993.	243.	1960.
244.	1918.	245.	1867.	246.	1810.	247.	1749.
248.	1684.	249.	1611.	250.	1531.	251.	1443.
252.	1353.	253.	1273.	254.	1213.	255.	1182.
256.	1178.	257.	1191.	258.	1209.	259.	1221.
260.	1223.	261.	1219.	262.	1210.	263.	1218.
264.	1229.	265.	1247.	266.	1267.	267.	1284.
268.	1295.	269.	1304.	270.	1314.	271.	1330.
272.	1355.	273.	1385.	274.	1406.	275.	1406.
276.	1374.	277.	1317.	278.	1272.	279.	1275.
280.	1364.	281.	1554.	282.	1816.	283.	2115.
284.	2414.	285.	2681.	286.	2909.	287.	3096.
288.	3239.	289.	3339.	290.	3402.	291.	3440.
292.	3465.	293.	3487.	294.	3513.	295.	3539.
296.	3563.	297.	3582.	298.	3595.	299.	3604.
300.	3610.	301.	3614.	302.	3617.	303.	3621.
304.	3626.	305.	3631.	306.	3636.	307.	3642.
308.	3646.	309.	3647.	310.	3645.	311.	3641.
312.	3639.	313.	3641.	314.	3653.	315.	3673.
316.	3693.	317.	3705.	318.	3701.	319.	3676.
320.	3638.	321.	3596.	322.	3560.	323.	3539.
324.	3532.	325.	3537.	326.	3549.	327.	3566.
328.	3586.	329.	3609.	330.	3632.	331.	3656.
332.	3681.	333.	3704.	334.	3726.	335.	3745.
336.	3761.	337.	3777.	338.	3788.	339.	3796.
340.	3801.	341.	3805.	342.	3804.	343.	3813.
344.	3822.	345.	3832.	346.	3843.	347.	3853.
348.	3859.	349.	3861.	350.	3860.	351.	3860.
352.	3861.	353.	3864.	354.	3870.	355.	3876.
356.	3884.	357.	3895.	358.	3904.	359.	3908.
360.	3906.	361.	3895.	362.	3878.	363.	3859.
364.	3842.	365.	3832.	366.	3828.	367.	3829.
368.	3831.	369.	3833.	370.	3833.	371.	3832.
372.	3830.	373.	3828.	374.	3827.	375.	3827.
376.	3827.	377.	3826.	378.	3825.	379.	3823.
380.	3822.	381.	3821.	382.	3821.	383.	3822.
384.	3823.	385.	3821.	386.	3816.	387.	3806.
388.	3787.	389.	3757.	390.	3713.	391.	3657.
392.	3597.	393.	3545.	394.	3512.	395.	3505.
396.	3504.	397.	3487.	398.	3428.	399.	3309.
400.	3150.	401.	2991.	402.	2876.	403.	2844.
404.	2898.	405.	3005.	406.	3129.	407.	3234.
408.	3304.	409.	3348.	410.	3380.	411.	3415.
412.	3462.	413.	3518.	414.	3573.	415.	3620.
416.	3652.	417.	3670.	418.	3678.	419.	3678.
420.	3675.	421.	3671.	422.	3669.	423.	3672.
424.	3682.	425.	3700.	426.	3722.	427.	3744.
428.	3763.	429.	3777.	430.	3785.	431.	3790.
432.	3792.	433.	3792.	434.	3790.	435.	3787.
436.	3784.	437.	3780.	438.	3777.	439.	3775.
440.	3773.	441.	3774.	442.	3775.	443.	3776.
444.	3775.	445.	3772.	446.	3767.	447.	3762.
448.	3762.	449.	3769.	450.	3784.	451.	3802.
452.	3815.	453.	3814.	454.	3794.	455.	3764.
456.	3740.	457.	3738.	458.	3772.	459.	3837.
460.	3915.	461.	3984.	462.	4025.	463.	4031.
464.	4014.	465.	3989.	466.	3969.	467.	3964.
468.	3969.	469.	3978.	470.	3985.	471.	3985.
472.	3980.	473.	3975.	474.	3975.	475.	3984.
476.	4002.	477.	4022.	478.	4041.	479.	4053.
480.	4059.	481.	4062.	482.	4068.	483.	4081.
484.	4103.	485.	4129.	486.	4156.	487.	4178.
488.	4191.	489.	4197.	490.	4199.	491.	4199.
492.	4200.	493.	4202.	494.	4204.	495.	4208.
496.	4212.	497.	4215.	498.	4216.	499.	4214.

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

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504.  4118.  505.  4085.  506.  4051.  507.  4020.
508.  3998.  509.  3982.  510.  3975.  511.  3970.
512.  3964.  513.  3953.  514.  3932.  515.  3899.
516.  3850.  517.  3783.  518.  3704.  519.  3631.
520.  3580.  521.  3571.  522.  3607.  523.  3668.
524.  3728.  525.  3760.  526.  3750.  527.  3719.
528.  3697.  529.  3717.  530.  3803.  531.  3931.
532.  4051.  533.  4114.  534.  4072.  535.  3933.
536.  3757.  537.  3603.  538.  3531.  539.  3567.
540.  3679.  541.  3830.  542.  3983.  543.  4109.
544.  4194.  545.  4231.  546.  4217.  547.  4143.
548.  4035.  549.  3924.  550.  3845.  551.  3826.
552.  3865.  553.  3931.  554.  4003.  555.  4045.
556.  4050.  557.  4032.  558.  4005.  559.  3982.
560.  3975.  561.  3977.  562.  3985.  563.  3993.
564.  3996.  565.  3994.  566.  3990.  567.  3986.
568.  3983.  569.  3982.  570.  3983.  571.  3984.
572.  3987.  573.  3991.  574.  3993.  575.  3993.
576.  3988.  577.  3980.  578.  3971.  579.  3964.
580.  3964.  581.  3971.  582.  3973.  583.  3958.
584.  3913.  585.  3828.  586.  3719.  587.  3610.
588.  3523.  589.  3483.  590.  3488.  591.  3517.
592.  3552.  593.  3572.  594.  3569.  595.  3552.
596.  3529.  597.  3508.  598.  3496.  599.  3491.
600.  3489.  601.  3487.  602.  3482.  603.  3475.
604.  3467.  605.  3457.  606.  3448.  607.  3440.
608.  3433.  609.  3430.  610.  3433.  611.  3443.
612.  3458.  613.  3478.  614.  3503.  615.  3530.
616.  3555.  617.  3570.  618.  3571.  619.  3552.
620.  3518.  621.  3476.  622.  3432.  623.  3392.
624.  3362.  625.  3346.  626.  3349.  627.  3374.
628.  3417.  629.  3468.  630.  3516.  631.  3548.
632.  3562.  633.  3561.  634.  3554.  635.  3548.
636.  3546.  637.  3548.  638.  3550.  639.  3548.
640.  3540.  641.  3528.  642.  3519.  643.  3517.
644.  3525.  645.  3541.  646.  3553.  647.  3550.
648.  3523.  649.  3471.  650.  3412.  651.  3364.
652.  3344.  653.  3363.  654.  3406.  655.  3459.
656.  3503.  657.  3527.  658.  3532.  659.  3526.
660.  3518.  661.  3515.  662.  3518.  663.  3527.
664.  3539.  665.  3553.  666.  3567.  667.  3582.
668.  3596.  669.  3608.  670.  3618.  671.  3625.
672.  3628.  673.  3627.  674.  3621.  675.  3610.
676.  3596.  677.  3578.  678.  3557.  679.  3534.
680.  3508.  681.  3481.  682.  3452.  683.  3423.
684.  3395.  685.  3371.  686.  3352.  687.  3341.
688.  3339.  689.  3347.  690.  3368.  691.  3400.
692.  3428.  693.  3430.  694.  3393.  695.  3301.
696.  3179.  697.  3065.  698.  2998.  699.  3015.
700.  3110.  701.  3241.  702.  3365.  703.  3438.
704.  3444.  705.  3405.  706.  3346.  707.  3294.
708.  3267.  709.  3260.  710.  3264.  711.  3269.
712.  3269.  713.  3265.  714.  3264.  715.  3273.
716.  3298.  717.  3323.  718.  3336.  719.  3313.
720.  3234.  721.  3101.  722.  2943.  723.  2792.
724.  2679.  725.  2627.  726.  2635.  727.  2698.
728.  2811.  729.  2967.  730.  3138.  731.  3292.
732.  3397.  733.  3422.  734.  3374.  735.  3277.
736.  3154.  737.  3041.  738.  2948.  739.  2889.
740.  2878.  741.  2927.  742.  3034.  743.  3170.
744.  3301.  745.  3394.  746.  3425.  747.  3408.
748.  3367.  749.  3325.  750.  3305.  751.  3309.
752.  3331.  753.  3363.  754.  3398.  755.  3430.
756.  3454.  757.  3477.  758.  3484.  759.  3478.
760.  3465.  761.  3449.  762.  3430.  763.  3427.
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FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

768.	3115.	769.	3030.	770.	3007.	771.	3080.
772.	3238.	773.	3436.	774.	3606.	775.	3715.
776.	3738.	777.	3703.	778.	3643.	779.	3591.
780.	3569.	781.	3570.	782.	3583.	783.	3594.
784.	3593.	785.	3581.	786.	3568.	787.	3556.
788.	3552.	789.	3550.	790.	3538.	791.	3504.
792.	3434.	793.	3334.	794.	3230.	795.	3148.
796.	3115.	797.	3146.	798.	3219.	799.	3310.
800.	3394.	801.	3450.	802.	3478.	803.	3483.
804.	3472.	805.	3449.	806.	3413.	807.	3356.
808.	3272.	809.	3151.	810.	3011.	811.	2874.
812.	2773.	813.	2737.	814.	2777.	815.	2860.
816.	2952.	817.	3015.	818.	3023.	819.	2984.
820.	2917.	821.	2838.	822.	2765.	823.	2710.
824.	2682.	825.	2691.	826.	2743.	827.	2830.
828.	2926.	829.	3005.	830.	3039.	831.	3023.
832.	2986.	833.	2959.	834.	2975.	835.	3052.
836.	3161.	837.	3266.	838.	3329.	839.	3319.
840.	3245.	841.	3131.	842.	3004.	843.	2888.
844.	2786.	845.	2688.	846.	2580.	847.	2450.
848.	2305.	849.	2179.	850.	2106.	851.	2122.
852.	2244.	853.	2439.	854.	2662.	855.	2872.
856.	3032.	857.	3142.	858.	3216.	859.	3267.
860.	3309.	861.	3347.	862.	3379.	863.	3406.
864.	3432.	865.	3454.	866.	3464.	867.	3456.
868.	3427.	869.	3379.	870.	3326.	871.	3285.
872.	3274.	873.	3304.	874.	3363.	875.	3430.
876.	3483.	877.	3502.	878.	3490.	879.	3462.
880.	3433.	881.	3418.	882.	3420.	883.	3419.
884.	3398.	885.	3337.	886.	3229.	887.	3098.
888.	2969.	889.	2872.	890.	2826.	891.	2814.
892.	2806.	893.	2773.	894.	2686.	895.	2558.
896.	2424.	897.	2321.	898.	2286.	899.	2327.
900.	2412.	901.	2508.	902.	2582.	903.	2610.
904.	2586.	905.	2512.	906.	2386.	907.	2214.
908.	2018.	909.	1834.	910.	1692.	911.	1624.
912.	1634.	913.	1711.	914.	1839.	915.	2005.
916.	2192.	917.	2381.	918.	2550.	919.	2681.
920.	2760.	921.	2802.	922.	2824.	923.	2842.
924.	2874.	925.	2919.	926.	2977.	927.	3042.
928.	3112.	929.	3184.	930.	3253.	931.	3315.
932.	3367.	933.	3410.	934.	3455.	935.	3514.
936.	3599.	937.	3713.	938.	3839.	939.	3953.
940.	4034.	941.	4063.	942.	4050.	943.	4013.
944.	3973.	945.	3948.	946.	3942.	947.	3944.
948.	3944.	949.	3933.	950.	3905.	951.	3866.
952.	3821.	953.	3774.	954.	3730.	955.	3698.
956.	3682.	957.	3691.	958.	3728.	959.	3786.
960.	3852.	961.	3912.	962.	3953.	963.	3974.
964.	3982.	965.	3984.	966.	3987.	967.	3992.
968.	3990.	969.	3968.	970.	3917.	971.	3831.
972.	3722.	973.	3604.	974.	3492.	975.	3397.
976.	3317.	977.	3240.	978.	3153.	979.	3047.
980.	2934.	981.	2848.	982.	2821.	983.	2886.
984.	3047.	985.	3263.	986.	3488.	987.	3676.
988.	3794.	989.	3851.	990.	3866.	991.	3860.
992.	3850.	993.	3841.	994.	3835.	995.	3831.
996.	3831.	997.	3834.	998.	3839.	999.	3844.
1000.	3847.						

FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

```
END OF COMPUTER RUN.          2 BATHYMETRIC PROFILES PROCESSED.
PROCESSED PROFILES HAVE BEEN WRITTEN TO OUTPUT FILE "TAPE63" AND PLOTTED IF PLOTTING HAS NOT BEEN SUPPRESSED.
```


FIGURE 8: EXPECTED SYNACC OUTPUT (continued)

V.7 Site Dependent Software

SYNACC contains FORTRAN code which may be site dependent. This code is in the form of subroutine calls to system routines that are not included in the PL provided in this package. These calls involve the FORTRAN interface with the operating system at DTNSRDC and are used in attaching and unloading cataloged mass storage files. It is possible that these subroutines have different names and/or argument lists at the bench mark site. Table VII lists candidate site dependent subroutines and the exact location in SYNACC at which each subroutine call is generated.

The user should reference Table VII and determine if either subroutine call is inappropriate at the bench mark site. For each site dependent subroutine found, the following course of action is recommended to modify the execution deck:

1. Determine the appropriate subroutine call and argument list to perform the desired function at the bench mark site. (Table III, page I-7, lists the purpose of each subroutine call).

2. Prepare the necessary FORTRAN cards to replace the existing call statement with the proper call. Certify that names given to variables in the new cards are consistent with existing names. To assist the user in this, Section V.7.1 and V.7.2 reproduce each call statement exactly as it appears in the FORTRAN compilation listing. Each argument in the call list is discussed. Additionally, Appendix G contains the complete compilation listing of the subroutine that generates the calls, and Appendix C contains user level documentation for each possible site dependent subroutine.

3. Replace the existing FORTRAN call statements in the execution deck with the appropriate new cards. The subroutine (GRDBLK) generating the calls has been punched on yellow-topped cards.

TABLE VII: LOCATION OF POSSIBLE SITE DEPENDENT SOFTWARE IN SYNACC

Possible Site Dependent Subroutine	PL or Program Name	Program Element	Line No.	Card ID*
UNLOAD	SYNACC	SUBROUTINE GRDBLK	29	GRDBLK30
ZPFUNC	SYNACC	SUBROUTINE GRDBLK	80	GRDBLK81

* SYNACC program cards have ID's in columns 73-80 because they were punched from an existing UPDATE Program Library.

V.7.1 UNLOAD references

FORTRAN Statement: Card ID:

CALL UNLOAD (ITAPE1) GRDBLK30

Argument List:

ITAPE1 — Integer variable defining unit number used by SYNACC for the data files. Set to 1 in a DATA statement. Input to UNLOAD.

V.7.2 ZPFUNC references

FORTRAN Statement: Card ID:

CALL ZPFUNC (IRC, IPRMS, NW) GRDBLK81

Argument List:

IRC — Integer variable defining type of function desired. Set to 1 on input to ZPFUNC to request attach function. Used for error flag on output from ZPFUNC.

IPRMS — A 22-word typeless array containing the following parameters needed to attach a file:

IPRMS (1) — Local file name for file being attached. Contains the 5 Hollerith characters TAPE1 left justified with 0 fill.

IPRMS (2-5) — Permanent file name. The first nine characters are always "FINALGRID" followed by from two to four alphanumeric digits. SUBROUTINE GRDBLK determines the necessary digits and constructs the complete permanent file name, then assigns it into IPRMS (2) and IPRMS (3). IPRMS (4) and IPRMS (5), as well as unused bytes in IPRMS (3) are 0 filled.

IPRMS (6) — File ID. Contains the 4 Hollerith characters PVRV left justified with 0 fill.

IPRMS (12) — File MR option for attach. Set to integer value 1.

IPRMS (14) — File cycle number. Set to integer value -1 to request latest cycle and to return cycle number in this word.

All other words of IPRMS are set to binary zero.

NW — Integer variable defining the last word filled in IPRMS. Set to 14.

Subroutine ZPFUNC is potentially the most troublesome of all the possible site dependent subroutines because data files must be cataloged in the job stream exactly as SUBROUTINE GRDBLK expects to find them. If there exist some site dependent constraints on cataloged file names or ID's, or, if system "set names" or other device specifications must be indicated, the user must update GRDBLK accordingly.

VI. INTERACT

VI.1 General Information

INTERACT is an interactive program consisting of a single executable module that is cataloged with the name BMINTERACT, ID=PUJA, in the INTERACT creation deck for later execution in interactive mode. The program generates calls to system utility subroutines REQUEST, UNLOAD and ZPFUNC which reside in a user library at DTNSRDC; however, in the bench mark run, these calls are not executed and therefore need not be satisfied. (They may be listed as unsatisfied external references when the program is loaded.) INTERACT is coded entirely in FORTRAN IV.

VI.2 Location of Program

The PL for INTERACT is the 12th PL (12th binary record) on the program tape CK0713, and the backup program tape, CK0720.

VI.3 Job Stream

The job stream included in the INTERACT creation deck and listed in Section VI.4 with comments performs the following basic functions: mounts program tape CK0713, updates from the INTERACT PL on tape, compiles, loads, and catalogs the absolute element. Job stream commands presented are those used on the DTNSRDC CDC 6600/6700 system. They may require modification at the bench mark site.

VI.4 Creation Deck

The deck supplied for INTERACT is not an execution deck but a creation deck which compiles the program and catalogs the absolute (executable) object code for later interactive execution. A listing of the INTERACT creation deck is presented in Figure 9 followed by comments. Numbers opposite card images in the figure coincide with the appropriate comment number.

Comment Number:	Card Image:
1 -	VSN,OLDPL=CK0713.
2 -	REQUEST,OLDPL,HY,NORING. /CK0713/NORING/
3 -	COPYBR,OLDPL,DUM,11.
4 -	RETURN,DUM.
5 -	UPDATE,F,R,C=COMPILE.
6 -	REWIND,COMPILE.
7 -	FTN,I=COMPILE,L=0,OPT=2,B=INRACT.
4 -	RETURN,COMPILE.
8 -	REQUEST,ABS,*PF.
9 -	LOAD,INRACT.
10 -	NOGO,ABS.
11 -	CATALOG,ABS,BMINTERACT,ID=PUJA.
* 12 -	7/8/9 END OF RECORD CARD
** 13 -	6/7/8/9 END OF JOB CARD

* This image represents a card with a 7/8/9 multi-punch in Col. 1.
** This image represents a card with a 6/7/8/9 multi-punch in Col. 1.

FIGURE 9: INTERACT CREATION DECK

The following comments refer to card images in the INTERACT creation deck listed in Figure 9.

Comment Number:	Comment:
1	Specify the program tape to be used.
2	Mount unlabeled program tape with local file name OLDPL. Density = 800 BPI (HY). No write ring.
3	Position program tape before the 12th PL, i.e., the 12th binary record.
4	This is done to minimize mass storage usage.
5	Create compile file from 12th PL on tape.
6	This card is needed because UPDATE R option inhibits automatic rewind.
7	Create the binary file INRACT.
8	Request permanent file space for purpose of cataloging the absolute element ABS.
9	Include the binary file INRACT in the load.
10	Complete loading but inhibit execution. All system routines needed to complete the executable module are in system libraries that are automatically included by the loader.
11	Catalog absolute element with name and ID shown for later execution in interactive mode.
12	Updates to Interact, if any, follow this card. Updates may be necessary to modify site dependent coding.
13	End of deck.

VI.5 Interactive Dialog

Figure 10 presents an interactive dialog between program INTERACT and the user. The dialog exercises many paths through INTERACT and should be duplicatable at the bench mark site. Events are numbered 1 through 255 for reference purposes where each event is either a prompt from INTERACT or an input from the user. Most user responses are very short and the entire dialog can be executed in 10 to 15 minutes with reasonably rapid response time. Note that Events 215 and 251 ask the user if he wants to catalog a file. The user must answer "N" (no) because the software needed for cataloging does not exist in the absolute object code. Before attempting to execute the dialog, the user must run the INTERACT creation deck to catalog the absolute program (see Section VI.4). Then, to initiate the program from an interactive terminal, the user must log in and enter the following commands:

```
ATTACH, INTER, BMINTERACT, ID=PUJA
INTER
```

Obviously, the permanent file name (in this case BMINTERACT) and the ID (in this case PUJA), as well as any additional information, must be those used to catalog the file at the bench mark site.

Following the above commands, the program will commence execution and respond with the prompt shown as Event 1 in Figure 10.

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
1	WELCOME TO INTERACT. WITH THIS SYSTEM YOU CAN 1) CREATE AN INPUT DATA SET FOR INTERFACE 2) MODIFY AN INPUT DATA SET FOR INTERFACE 3) CREATE AN INPUT DATA SET FOR CFIELD PLOT 4) MODIFY AN INPUT DATA SET FOR CFIELD PLOT ENTER THE INDEX OF THE FUNCTION TO PERFORM	
2		1
3	WILL THERE BE AUTO-OCEAN INPUT DATA (Y OR N)	
4		N
5	ANSWER THE FOLLOWING QUESTIONS Y OR N DELIMITED BY COMMAS 1) DO YOU WANT SPHERICAL EARTH CORRECTION 2) DO YOU WANT THE CALCULATED CONNECTIONS PRINTED 3) DO YOU WANT THE CALCULATED QUANTITIES FOR EACH TRIANGULAR SECTOR PRINTED	
6		Y, N, N
7	SPECIFY THE SURFACE LAYER DUCT IN ONE OF 3 WAYS – 1) ENTER 0 FOR NO SURFACE LAYER 2) ENTER -1 FOR LAYER DEPTH TO BE DETERMINED BY MODEL 3) ENTER INDEX OF SURFACE LAYER DEPTH ON FIRST PROFILE	
8		1
9	DATA ENTRY COMPLETE FOR EARTH CORRECTION, PRINT FLAGS, AND SURFACE LAYER DUCT DO YOU WISH TO REVIEW (Y OR N)	
10		Y
11	1) SPHERICAL EARTH CORRECTION APPLIED YES 2) CALCULATED CONNECTIONS PRINTED NO 3) CALCULATED QUANTITIES PRINTED NO IF YOU WANT TO CHANGE ANY OF THE ABOVE PARAMETERS ENTER THE INDEX NUMBER WHEN DONE ENTER AN INDEX GREATER THAN THREE	

FIGURE 10: INTERACT DIALOG

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
12		5
13	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
14		N
15	SURFACE LAYER SPECIFICATION IS 1 DO YOU WANT TO CHANGE IT (Y OR N)	
16		N
17	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
18		N
19	ENTER THE FOLLOWING VALUES DELIMITED BY COMMAS 1) RANGE (NM) OF THE FOLLOWING PROFILE 2) NUMBER OF POINTS IN THE FOLLOWING PROFILE 3) NUMBER OF INTERPOLATED PROFILES DESIRED 4) WAVE HEIGHT (FT)	
20		0, 3, 2, 5
21	IS 3 THE NUMBER OF PROFILE POINTS (Y OR N)	
22		Y
23	ENTER 3 (DEPTH, SPEED) PAIRS A PAIR AT A TIME 1-	
24		0, 1500
25	2-	
26		30, 1505
27	3-	
28		2000, 1490
29	DO YOU WISH TO REVIEW (Y OR N)	
30		Y

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
31	1) RANGE (NM) OF FOLLOWING PROFILE IS 0.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 3 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	
32		2, 4
33	NEXT —	
34		6
35	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
36		Y
37	1) RANGE (NM) OF FOLLOWING PROFILE IS 0.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 4 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	
38		6
39	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
40		N
41	THERE ARE 4 (DEPTH, SPEED) PAIRS INDEX DEPTH SPEED 1 0.00 1500.00 2 30.00 1505.00 3 2000.00 1490.00 4 0.00 0.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
42		1
43	ENTER PAIR	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
44		0, 1501
45	NEXT – ENTER INDEX	
45.1		4
46	ENTER PAIR	
46.1		5000, 1540
47	NEXT – ENTER INDEX	
48		200
49	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
50		N
51	ARE THERE MORE PROFILES TO ENTER (Y OR N)	
52		Y
53	ENTER THE NUMBER OF SPECIFIED CONNECTIONS BETWEEN THIS PROFILE AND THE NEXT	
54		3
55	ENTER 3 (UPRANGE, DOWNRANGE) PAIRS A PAIR AT A TIME 1-	
56		1, 2
57	2-	
58		2, 3
59	3-	
60		4, 4
61	DO YOU WISH TO REVIEW (Y OR N)	
62		N

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
63	ENTER THE FOLLOWING VALUES DELIMITED BY COMMAS 1) RANGE (NM) OF THE FOLLOWING PROFILE 2) NUMBER OF POINTS IN THE FOLLOWING PROFILE 3) NUMBER OF INTERPOLATED PROFILES DESIRED 4) WAVE HEIGHT (FT)	
64		100, 5, 2, 5
65	IS 5 THE NUMBER OF PROFILE POINTS (Y OR N)	
66		Y
67	ENTER 5 (DEPTH, SPEED) PAIRS A PAIR AT A TIME 1-	
68		0, 1502
69	2-	
70		20, 1502
71	3-	
72		500, 1480
73	4-	
74		3000, 1530.4
75	5-	
76		3500.0, 1535
77	DO YOU WITH TO REVIEW (Y OR N)	
78		Y
79	1) RANGE (NM) OF FOLLOWING PROFILE IS 100.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 5 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	
80		6

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
81	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
82		N
83	THERE ARE 5 (DEPTH, SPEED) PAIRS INDEX DEPTH SPEED 1 0.00 1502.00 2 20.00 1502.00 3 500.00 1480.00 4 3000.00 1530.40 5 3500.00 1535.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
84		200
85	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
86		N
87	ARE THERE MORE PROFILES TO ENTER (Y OR N)	
88		Y
89	ENTER THE NUMBER OF SPECIFIED CONNECTIONS BETWEEN THIS PROFILE AND THE NEXT	
90		0
91	DO YOU WISH TO REVIEW (Y OR N)	
92		N
93	ENTER THE FOLLOWING VALUES DELIMITED BY COMMAS 1) RANGE (NM) OF THE FOLLOWING PROFILE 2) NUMBER OF POINTS IN THE FOLLOWING PROFILE 3) NUMBER OF INTERPOLATED PROFILES DESIRED 4) WAVE HEIGHT (FT)	
94		500, 3, 2, 5
95	IS 3 THE NUMBER OF PROFILE POINTS (Y OR N)	
96		Y

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
97	ENTER 3 (DEPTH, SPEED) PAIRS A PAIR AT A TIME 1-	
98		0, 1503
99	2-	
100		1000, 1475
101	3-	
102		5000, 1550
103	DO YOU WISH TO REVIEW (Y OR N)	
104		N
105	ARE THERE MORE PROFILES TO ENTER (Y OR N)	
106		N
107	ENTER THE NUMBER OF BATHYMETRY POINTS	
108		5
109	ENTER M OR F FOR METERS OR FEET	
110		M
111	ENTER 5 BATHYMETRY (RANGE, DEPTH) PAIRS A PAIR AT A TIME 1-	
112		0, 3000
113	2-	
114		10, 3200
115	3-	
116		100, 6000
117	4-	
118		400, 7000
119	5-	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
120		500, 6500
121	DO YOU WISH TO REVIEW (Y OR N)	
122		N
123	ENTER THE NUMBER OF RANGES AT WHICH BOTTOM CLASS VALUES WILL BE ASSIGNED	
124		4
125	ENTER 4 (RANGE, 1-5 CLASS, 1-9 CLASS) TRIPLES A TRIPLE AT A TIME 1-	
126		0, 1, 3
127	2-	
128		100, 2, 7
129	3-	
130		200, 4, 9
131	4-	
132		300, 3, 7
133	DO YOU WISH TO REVIEW (Y OR N)	
134		Y
135	THERE ARE 4 BOTTOM CLASS POINTS SPECIFIED DO YOU WANT TO CHANGE THE NUMBER (Y OR N)	
136		Y
137	NEW NUMBER IS --	
138		6

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
139	INDEX RANGE (NM) 1-5 CLASS 1-9 CLASS 1 0.00 1 3 2 100.00 2 7 3 200.00 4 9 4 300.00 3 7 5 0.00 0 0 6 0.00 0 0 ENTER AN INDEX AND A NEW BOTTOM CLASS TRIPLE WHEN DONE ENTER AN INDEX GREATER THAN 150 ENTER INDEX	
140		5
141	ENTER TRIPLE	
142		323, 2, 5
143	NEXT – ENTER INDEX	
144		6
145	ENTER TRIPLE	
146		400, 4, 4
147	NEXT – ENTER INDEX	
148		200
149	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
150		Y
151	INDEX RANGE (NM) 1-5 CLASS 1-9 CLASS 1 0.00 1 3 2 100.00 2 7 3 200.00 4 9 4 300.00 3 7 5 323.00 2 5 6 400.00 4 4 ENTER AN INDEX AND A NEW BOTTOM CLASS TRIPLE WHEN DONE ENTER AN INDEX GREATER THAN 150 ENTER INDEX	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
152		200
153	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
154		N
155	DATA SET COMPLETE DO YOU WISH TO REVIEW (Y OR N)	
156		Y
157	ENTER THE NUMBER CORRESPONDING TO THE DATA YOU WISH TO REVIEW 1) ALL 2) EARTH CORRECTION, PRINT FLAGS, AND DUCT 3) PROFILE DATA AND (DEPTH, SPEED) PAIRS 4) CONNECTION DATA 5) BATHYMETRY DATA 6) BOTTOM CLASS DATA	
158		1
159	1) SPHERICAL EARTH CORRECTION APPLIED YES 2) CALCULATED CONNECTIONS PRINTED NO 3) CALCULATED QUANTITIES PRINTED NO IF YOU WANT TO CHANGE ANY OF THE ABOVE PARAMETERS ENTER THE INDEX NUMBER WHEN DONE ENTER AN INDEX GREATER THAN THREE	
160		5
161	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
162		N
163	SURFACE LAYER SPECIFICATION IS 1 DO YOU WANT TO CHANGE IT (Y OR N)	
164		N
165	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
166		N
167	1) RANGE (NM) OF FOLLOWING PROFILE IS 0.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 4 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
168		10
169	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
170		N
171	THERE ARE 4 (DEPTH, SPEED) PAIRS INDEX DEPTH SPEED 1 0.00 1501.00 2 30.00 1505.00 3 2000.00 1490.00 4 5000.00 1540.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
172		200
173	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
174		N
175	THERE ARE 3 CONNECTIONS SPECIFIED BETWEEN THIS PROFILE AND THE NEXT. DO YOU WANT TO CHANGE THE NUMBER (Y OR N)	
176		N
177	CONNECTION POINTS INDEX LEFT RIGHT 1 1 2 2 2 3 3 4 4 ENTER AN INDEX AND NEW CONNECTION PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
178		200
179	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
180		N

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
181	1) RANGE (NM) OF FOLLOWING PROFILE IS 100.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 5 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	
182		10
183	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
184		N
185	THERE ARE 5 (DEPTH, SPEED) PAIRS INDEX DEPTH SPEED 1 0.00 1502.00 2 20.00 1502.00 3 500.00 1480.00 4 3000.00 1530.40 5 3500.00 1535.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
186		200
187	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
188		N
189	THERE ARE 0 CONNECTIONS SPECIFIED BETWEEN THIS PROFILE AND THE NEXT. DO YOU WANT TO CHANGE THE NUMBER (Y OR N)	
190		N
191	1) RANGE (NM) OF FOLLOWING PROFILE IS 500.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 3 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	
192		10

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
193	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
194		N
195	THERE ARE 3 (DEPTH, SPEED) PAIRS INDEX DEPTH SPEED 1 0.00 1503.00 2 1000.00 1475.00 3 5000.00 1550.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
196		200
197	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
198		N
199	END OF PROFILE DATA THERE ARE 5 BATHYMETRY POINTS SPECIFIED DO YOU WANT TO CHANGE THE NUMBER (Y OR N)	
200		N
201	BATHYMETRY IN METERS, DO YOU WANT FEET? (Y OR N)	
202		N
203	INDEX RANGE (NM) DEPTH 1 1.00 3000.00 2 10.00 3200.00 3 100.00 6000.00 4 400.00 7000.00 5 500.00 6500.00 ENTER AN INDEX AND NEW BATHYMETRY PAIR WHEN DONE ENTER AN INDEX GREATER THAN 300 ENTER INDEX	
204		400
205	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
206		N
207	THERE ARE 6 BOTTOM CLASS POINTS SPECIFIED DO YOU WANT TO CHANGE THE NUMBER (Y OR N)	
208		N
209	INDEX RANGE (NM) 1-5 CLASS 1-9 CLASS 1 0.00 1 3 2 100.00 2 7 3 200.00 4 9 4 300.00 3 7 5 323.00 2 5 6 400.00 4 4 ENTER AN INDEX AND A NEW BOTTOM CLASS TRIPLE WHEN DONE ENTER AN INDEX GREATER THAN 150 ENTER INDEX	
210		200
211	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
212		N
213	DO YOU WISH TO REVIEW MORE DATA (Y OR N)	
214		N
215	DO YOU WANT TO CATALOG THE FILE (Y OR N)	
216		N
217	ARE YOU DONE FOR THIS SESSION (Y OR N)	
218		N
219	WELCOME TO INTERACT. WITH THIS SYSTEM YOU CAN 1) CREATE AN INPUT DATA SET FOR INTERFACE 2) MODIFY AN INPUT DATA SET FOR INTERFACE 3) CREATE AN INPUT DATA SET FOR CFIELD PLOT 4) MODIFY AN INPUT DATA SET FOR CFIELD PLOT ENTER THE INDEX OF THE FUNCTION TO PERFORM	
220		2
221	FILE TO BE MODIFIED IS ATTACHED TO TAPE10 IS THIS OK (Y OR N)	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
222		Y
223	WILL THERE BE AUTO-OCEAN INPUT DATA (Y OR N)	
224		N
225	ENTER THE NUMBER CORRESPONDING TO THE DATA YOU WISH TO REVIEW 1) ALL 2) EARTH CORRECTION, PRINT FLAGS, AND DUCT 3) PROFILE DATA AND (DEPTH, SPEED) PAIRS 4) CONNECTION DATA 5) BATHYMETRY DATA 6) BOTTOM CLASS DATA	
226		3
227	SPECIFY THE RANGE OF THE PROFILE TO REVIEW A NEGATIVE RANGE SPECIFIES ALL	
228		0
229	1) RANGE (NM) OF FOLLOWING PROFILE IS 0.00 2) NO. OF POINTS IN FOLLOWING PROFILE IS 4 3) NO. OF INTERPOLATED PROFILES IS 2 4) WAVE HEIGHT (FT) IS 5.00 ENTER THE INDEX NUMBER AND THE NEW VALUE WHEN DONE, OR IF NO CHANGE ENTER AN INDEX VALUE GREATER THAN 5	
230		6
231	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
232		N
233	THERE ARE 4 (DEPTH, SPEED) PAIRS INDEX DEPTH SPEED 1 0.00 1501.00 2 30.00 1505.00 3 2000.00 1490.00 4 5000.00 1540.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
234		2
235	ENTER PAIR	
236		35, 1510
237	NEXT – ENTER INDEX	
238		200
239	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
240		Y
241	INDEX DEPTH SPEED 1 0.00 1501.00 2 35.00 1510.00 3 2000.00 1490.00 4 5000.00 1540.00 ENTER THE INDEX AND A NEW (DEPTH, SPEED) PAIR WHEN DONE ENTER AN INDEX GREATER THAN 100 ENTER INDEX	
242		200
243	DO YOU WISH TO REVIEW THE CHANGE (Y OR N)	
244		N
245	DO YOU WANT TO REVIEW THE SPECIFIED CONNECTIONS (Y OR N)	
246		N
247	DO YOU WISH TO REVIEW MORE DATA (Y OR N)	
248		N
249	DO YOU WISH TO REVIEW MORE DATA (Y OR N)	
250		N
251	DO YOU WANT TO CATALOG THE FILE (Y OR N)	
252		N

FIGURE 10: INTERACT DIALOG (continued)

EVENT NO.	PROGRAM PROMPT	USER RESPONSE
253	ARE YOU DONE FOR THIS SESSION (Y OR N)	
254		Y
255	STOP	

FIGURE 10: INTERACT DIALOG (continued)

VI.6 Site Dependent Software

INTERACT contains FORTRAN code which may be site dependent. This code is in the form of calls to system subroutine CONNEC which is not included in the PL provided in this package. CONNEC is the FORTRAN/Terminal interface subroutine called to connect a file unit designator to the interactive terminal. All connected files must be declared on the "PROGRAM" card (i.e., the first card in the FORTRAN program). It is possible that this subroutine may have a different name and/or argument list at the bench mark site. Table VIII lists the exact locations in INTERACT at which CONNEC is called.

If the call to CONNEC is inappropriate at the bench mark site, the following course of action is recommended to modify the creation deck:

1. Determine the appropriate subroutine call and argument list to connect a file unit designator to an interactive terminal.

2. Prepare the necessary update cards to delete the existing call statements and replace them with the proper calls. Certify that any variable names in the updates are consistent with existing names. To assist the user in this, Section VI.6.1 reproduces each call statement exactly as it appears in the FORTRAN compilation listing, and describes the call list. Additionally, Appendix H contains the complete compilation listing of the main program which calls CONNEC, and Appendix C contains user level documentation for CONNEC.

3. Insert update cards in the INTERACT creation deck immediately after the "7/8/9" card with the annotation "INRACT updates follow this card."

TABLE VIII: LOCATION OF POSSIBLE SITE DEPENDENT SOFTWARE IN INTERACT

Possible Site Dependent Subroutine	PL or Program Name	Program Element	Line No.	Line ID
CONNEC	INRACT	PROGRAM INRACT	18	INRACT.19
			19	INRACT.20

VI.6.1 CONNEC references

FORTRAN Statement: Line ID:

CALL CONNEC(1) INRACT 19

Argument List:

1 — Integer file unit number input to CONNEC. All input from the terminal is achieved by reading from unit 1. TAPE1 is declared on the program card.

FORTRAN Statement: Line ID:

CALL CONNEC (2) INRACT 20

Argument List:

2 -- Integer file unit number input to CONNEC. All output to the terminal is achieved by writing to unit 2. TAPE2 is declared on the program card.

APPENDIX A

JOB CARD INFORMATION

Appendix A presents information regarding program time and size to assist the user in preparing the JOB card for each execution deck. Values shown should be more than sufficient to load and execute each program. Sample JOB and CHARGE cards are not included in this document because they are obviously site dependent.

Program Execution Deck	Suggested Memory Size Request (Octal)	Suggested CPU Time Request (Decimal Seconds)	Suggested I/O Time Request (Decimal Seconds)	Maximum Number of 7-Track Tapes
MPP	140000	140	200	1
AUTO-OCEAN	110000	50	100	1
NEWPE	210000	300	100	1
SYNACC	100000	60	50	1
INTERACT*	70000	25	50	1

* Suggested requests for INTERACT creation deck. The interactive dialog (Section VI.5) should require less than 10. seconds of CPU time.

APPENDIX B

INTEGER FUNCTION "FIELD"

Integer function "FIELD" is a COMPASS coded function existing in the AUTO-OCEAN PL on the program tape. It has three arguments: NBITS, NSTART, and NWORD. Its purpose is to extract a bit string NBITS long from word NWORD starting at bit position NSTART (bits numbered 0 through 59, left to right) and place the string in FIELD, right justified, binary-zero filled. The assembler listing of FIELD is presented on the following pages to assist the user in the event the FORTRAN compiler at the bench mark site cannot accept a COMPASS routine intermingled with FORTRAN routines.

FIELD
STORAGE ALLOCATION.

ADDRESS	LENGTH	BINARY CONTROL CARDS.
0	11	IDENT FIELD
11		END

ENTRY POINTS.

FIELD 1.

```
                                IDENT FIELD                                          FIELD     2
                              * FIELD(NBITS,NSTART,NWORD)                            FIELD     3
                                ENTRY FIELD                                          FIELD     4
 0  0611051404555500000 3       VFD   42/0HFIELD,18/3                               FIELD     5
 1  0000000000000000000 0 FIELD DATA  0                                              FIELD     6
 2  64500                       SB5   A0       STORE A0 IN B5                      FIELD     7
        54010                   SA0   A1       BASE ADDRESS                        FIELD     8
             43001              MX0   1        MASK BIT IN X0                      FIELD     9
                  54500         SA5   A0       GET ...                             FIELD    10
 3  53150                       SA1   X5         FIRST ARGUMENT IN X1              FIELD    11
        6211777776              SB1   X1-1     B1=NBITS-1                          FIELD    12
                  23010         AX0   B1,X0    MASK OF LENGTH NBITS                FIELD    13
 4  5050000001                  SA5   A0+1B    GET ...                             FIELD    14
             53250              SA2   X5         SECOND ARGUMENT                   FIELD    15
 5  6222000001                  SB2   X2+1     SET B2=NSTART+1                     FIELD    16
             22020              LX0   X0,B2    SHIFT MASK TO NSTART                FIELD    17
 6  5050000002                  SA5   A0+2B    GET ...                             FIELD    18
             53350              SA3   X5         THIRD ARGUMENT                    FIELD    19
                  11603         BX6   X0*X3    EXTRACT DESIRED FIELD               FIELD    20
 7  6142777702                  SB4   B2-61                                        FIELD    21
             67414               SB4   B1-B4    B4=(59-NSTART)+NBITS                FIELD    22
                  22646         LX6   X6,B4     RIGHT-JUSTIFY RESULTS               FIELD    23
10  56050                       SA0   B5       RESTORE A0                          FIELD    24
        0400000001 *            JR    B0,FIELD                                     FIELD    25
11                              END                                                  FIELD    26

                474400B CM  STORAGE USED              25 STATEMENTS      1 SYMBOLS
                            MODEL 74 ASSEMBLY         0.257 SECONDS      3 REFERENCES
```

SYMBOLIC REFERENCE TABLE.

FIELD	1	PROGRAM*	2/03 F	2/05 L	2/24

S

APPENDIX C

DOCUMENTATION OF POSSIBLE SITE DEPENDENT SOFTWARE

Appendix C presents user level documentation for subroutines that may be site dependent and thus require special attention at the bench mark site. This documentation has been extracted from various CDC manuals and cataloged information files.

CALL RANSET(n)

Initializes seed of RANF. n is a one-word bit pattern. Bit 0 will be set to 1 (forced odd), and bits 59 through 48 will be set to 1717 octal.

CALL RANGET(n)

Obtains current seed of RANF between 0 and 1. n is a symbolic name to receive the seed. It is not necessarily normalized. The value returned may be passed to RANSET at a later time to regenerate the same sequence of random numbers.

OPERATING SYSTEM INTERFACE ROUTINES

DATE(a) or CALL DATE(a)†

The current date is returned as the value of argument a or of the function in the form 10Hbmm dd yyb (under NOS BE 1) or 10Hbmm dd yy (under NOS 1, SCOPE 2), where b denotes a blank, mm is the number of the month, dd is the number of the day within the month, and yy is the year. The value returned is Hollerith data and can be output using an A format specification.

The default type of the function DATA is real, thus if J and K are integer variables as in

```
J = DATE(K)
```

J will not be useful because the value returned will have been converted from real to integer.

JDATE(a) or CALL JDATE(a)† ‡

The current date is returned as the value of argument a or of the function in the form 5Ryyddd, where yy is the year and ddd is the number of the day within the year. The value returned is Hollerith data and can be output using an R format specification. The type of the function JDATE is integer.

SECOND(t) or CALL SECOND(t)†

The central processor time is returned from start-of-job in seconds as a real number, usually accurate to two decimal places. t is a real variable.

Example

```
DPTIM = SECOND (CP)
```

---

† These routines can be used as functions or subroutines. The value is returned via the argument and the normal function return.

‡ Not available under SCOPE 2.

CALL WRITEC(a,b,n)

Transfers data from central memory to extended core storage or LCM.

No type conversion is done.

Example

```
LEVEL 3,8
CALL READEC(A,B,10)
CALL WRITEC(A,B,10)
```

TERMINAL INTERFACE SUBPROGRAMS‡

CALL CONNEC (u,cs)

u unit designator.

cs optional character set designator (applicable to NOS/BE 1 only): cs is an integer with a value from 0 to 2, in accordance with the character set to be used for the data entered or displayed at the terminal.

0 display code (default)
1 ASCII-95
2 ASCII-256 code

cs should not be specified if the installation character set is a 63-character set.

If a FORTRAN program to be run under INTERCOM for NOS/BE 1, under the NOS 1 Time-Sharing System, or under HELLO7 for SCOPE 2, calls for input/output operations through the user's remote terminal, all files to be accessed through the terminal must be formally associated with the terminal at the time of execution.

In particular, the file INPUT must be connected to the terminal if data is to be entered there and an alternate logical unit is not designated in the READ statement. The file OUTPUT must be connected to the terminal if execution diagnostics are to be displayed or printed at the terminal, or if data is to be displayed or printed there and an alternate unit is not designated in the WRITE or PRINT statement. These files are automatically connected to the terminal when the program is executed under NOS 1 or under the RUN command of the EDITOR utility of INTERCOM.

Under HELLO7, any file can be connected by providing a FILE control statement specifying CNF = YES.

Under INTERCOM, any file can be connected to the terminal by the CONNECT command.

Under all three operating systems, the user can connect any file from within the program by using the CALL CONNEC statement.

‡ More information about INTERCOM is in the INTERCOM reference manual and the INTERCOM Interactive Guide for Users of FORTRAN Extended. More information about NOS 1 is in the NOS 1 Time-Sharing User's reference manual. More information about HELLO7 is in the SCOPE 2 reference manual.

Under NOS 1, if CONNEC specifies an existing local file, the buffers for the file are flushed (if it is an output file) and the file is returned. A subsequent DISCON for the file causes the connected file to be returned, but the pre-existing file is not reassociated with the file name.

If cs is not specified, it is set to 0. If display code is selected, input/output operations must be formatted, list-directed, NAMELIST, or buffered.

If either of the ASCII codes is selected, input/output operations must be either formatted or buffered. When buffer input/output is used, either a FILE control statement (section 16) specifying RT=S must be provided, or blanks cannot terminate a line.

When a CALL CONNEC specifies a file already connected with the character set specified, the call is ignored. If the file specified is already connected with a character set other than that specified, cs is reset accordingly.

Data input or output through a terminal under INTERCOM is represented ordinarily in a CDC 64-character or ASCII 64-character set, depending on installation option. For these sets, ten characters in 6-bit display code are stored in each central memory word. As described above, a terminal user can specify from within a FORTRAN program that data represented in an ASCII 95-character set (providing the capability for recognizing lowercase letters) or an ASCII 256-character set (providing the capability for recognizing lower-case letters, control codes, and parity) be input or output through the terminal. For the ASCII 95-character and 256-character sets, characters are stored in five 12-bit bytes in each central memory word. Characters in the ASCII 95-character set are represented in 7-bit ASCII code right justified in each byte with binary zero fill; characters in the ASCII 256-character set are represented in 8-bit ASCII code right justified in each byte with binary zero fill. When data represented in either ASCII character set code is transferred with a formatted input/output statement, the maximum record length should be specified in the PROGRAM statement as twice the number of characters to be transferred (see section 7). Allowance should also be made in input/output operations for the fact that internal characters require twice as much space as external characters.

When the ASCII 95-character or 256-character set has been specified for terminal input/output under INTERCOM, blanks following the end of data on each line are not translated into ASCII code but are retained in display code (as 55_8). Unless the user eliminates them, these blanks will appear on output as lowercase m characters (two blanks in display code translates to one m in ASCII code). For formatted input, the user can identify the end of data on a line by scanning data entered in nR2 format until the Holierith constant 2Rbb (b = blank) is found. For buffered input, the end can be determined by reading the data into an array, manipulating it with a DECODE statement, and then scanning as with formatted input.

For a FORTRAN program run under NOS 1, any file can be connected to the terminal by the ASSIGN command. In addition, the user can connect any file from within the program by using the statement:

```
CALL CONNEC (u)
```

Data input or output through a terminal under NOS 1 is represented ordinarily in a standard 61-character set. However, the user can elect to have data represented in an ASCII 128-character set (which provides the capability for recognizing control codes and lowercase, as well as uppercase, letters) by entering the ASCII command. Characters contained in the standard set are stored internally in 6-bit display code, whether or not the ASCII command has been entered. The additional characters which complete the ASCII 128-character set are stored internally in 12-bit display code if the ASCII command has been entered; otherwise, they are mapped into the standard 61-character set and stored internally in 6-bit display code.

Under any system, if a file specified in a CALL CONNEC exists as a local file but is not connected at the time of the call, the file's buffer is flushed before the file is connected to the terminal.

CALL DISCON (u)

This subroutine disconnects a file from within a FORTRAN program.

This request is ignored if the specified file is not connected. After execution of this statement, the specified file remains local to the terminal. In addition, if the file existed prior to connection, the file name is re-associated with the information contained on the device where the file resided prior to connection. Data written to a connected file is not contained in the file after it is disconnected.

All files to be connected or disconnected during program execution must be declared in the PROGRAM statement. An attempt to connect or disconnect an undeclared file results in a fatal diagnostic.

Calls to CONNEC and DISCON are recognized and ignored when programs are not executed under INTERCOM or interactively under NOS 1.

Examples:

```
CALL CONNEC (6)

K = 4LAGES
CALL CONNEC (K)

CALL CONNEC (6,2)

CALL CONNEC (4LDATA,1)

CALL DISCON (6)
```

MASS STORAGE INPUT/OUTPUT

Mass storage input/output (MSIO) subroutines allow the user to create, access, and modify files on a random basis without regard for their physical positioning. Each record in the file can be read or written at random without logically affecting the remaining file contents. The length and content of each record are determined by the user. A random file can reside on any mass storage device. Record Manager word addressable file organization is used to implement MSIO files. The Record Manager reference manual contains details of word addressable implementation.

A file processed by mass storage subroutines should not be processed by any other form of input/output.

RANDOM FILE ACCESS

Random file manipulations differ from conventional sequential file manipulations. In a sequential file, records are stored in the order in which they are written, and can normally be read back only in the same order. This can be slow and inconvenient in applications where the order of writing and of retrieving records differ and, in addition, it requires a continuous awareness of the current file position and the position of the required record. To remove these limitations, a randomly accessible file capability is provided by the mass storage input/output subroutines.

In a random file, any record may be read, written or rewritten directly, without concern for the position or structure of the file. This is possible because the file resides on a random-access mass storage device that can be positioned to any portion of a file. Thus, the entire concept of file position does not apply to a random file. The notion of rewinding a random file is, for instance, without meaning.

To permit random accessing, each record in a random file is uniquely and permanently identified by a record key. A key is an 18- or 60-bit quantity, selected by the user and included as a parameter on the call to read or write a record. When a record is first written, the key in the call becomes the permanent identifier for that record. The record can be retrieved later by a read call that includes the same key, and it can be updated by a write call with the same key.

When a random file is in active use, the record key information is kept in an array in the user's field length. The user is responsible for allocating the array space by a DIMENSION, type, or similar array declaration statement, but must not attempt to manipulate the array contents. The array becomes the directory or index to the file contents. In addition to the key data, it contains the word address and length of each record in the file. The index is the logical link that enables the mass storage subroutines to associate a user call key with the hardware address of the required record.

The index is maintained automatically by the mass storage subroutines. The user must not alter the contents of the array containing the index in any manner; to do so may result in destruction of the file contents. (In the case of a sub-index, the user must clear the array before using it as a sub-index, and read the sub-index into the array if an existing file is being reopened and manipulated. However, individual index entries should not be altered.)

Under NOS/BE 1 and SCOPE 2, when a permanent file that was created by mass storage input/output routines is to be modified, the EXTEND control statement should be used to ensure that the new index is made permanent.

In response to a call to open the file, the mass storage subroutine automatically clear the assigned index array. If an existing file is being reopened, the mass storage subroutines locate the master index in mass storage and read it into this array. Subsequent file manipulations make new index entries or update current entries. When the file is closed, the master index is written from the array to the mass storage device. When the file is reopened, by the same job or another job, the index is again read into the index array space provided, so that file manipulation may continue.

MASS STORAGE SUBROUTINES

Object time input/output subroutines control the transfer of records between central memory and mass storage.

OPENING A FILE

OPENMS opens the mass storage file and informs the system that it is a random (word addressable) file.

CALL OPENMS (u,ix,lngth,t)

u Unit designator.

ix Name of the array containing the master index.

lngth Length of master index

for a number index: lngth ≥ (number of entries in master index) + 1

for a name index: lngth ≥ 2 * (number of entries in master index) + 1

t Type of index.

t = 0 file has a number master index

t = 1 file has a name master index

The array (ix) specified in the call is automatically cleared to zeros. If an existing file is being reopened, the master index is read from mass storage into the index array.

Example:

```
DIMENSION I(11)
CALL OPENMS (5,I,11,0)
```

These statements prepare for random input/output on the file TAPE5 using an 11-word master index of the number type. If the file already exists, the master index is read into memory starting at address 1.

WRITING RECORDS

WRITMS transmits data from central memory to the file.

CALL WRITMS (u,fwa,n,k,r,s)

u Unit designator

fwa Name of the array in central memory (address of first word).

n Number of 60-bit words to be transferred.

k Record key.

for number index: $1 \leq k \leq lngth - 1$

for name index k = any 60-bit quantity except ±0

r *Rewrite.*

r = 1 Rewrite in place. Unconditional request; fatal error occurs if new record length exceeds old record length.

r = -1 Rewrite in place if new record length does not exceed old record length, otherwise write at end of information.

r = 0 No rewrite; write at end of information (default value).

s Sub-index flag.

s = 1 Write sub-index marker flag in index control word for this record.

s = 0 Do not write sub-index marker flag in index control word (default value).

Except under SCOPE 2, Record Manager operates more efficiently if n is always a multiple of 64. The r parameter can be omitted if the s parameter is also omitted. The s parameter is for future file editing routines. Current routines do not test the flag, but the user should include this parameter in new programs (when appropriate) to facilitate transition to a future edit capability.

Example:

```
CALL WRITMS (3,DATA,25,6,1)
```

This statement unconditionally rewrites in place of file TAPE3, starting at the address of the array named DATA, a 25-word record with an index number key of 6. The default value is taken for the s parameter.

READING RECORDS

READMS transmits data from the file to central memory.

CALL READMS (u,fwa,n,k)

u Unit designator

fwa Name of the array in central memory (address of first word)

n Number of 60-bit words to be transferred. If n is less than the record length, n words are transferred without diagnostic.

k Record key

for number index: $k = 1 \leq k \leq lngth - 1$

for name index: k = any 60-bit quantity except ±0

Except under SCOPE 2, Record Manager operates more efficiently if n is always a multiple of 64.

Example

```
CALL READMS (3,DATAMOR,25,2)
```

This statement reads the first 25 words of record 2 from unit 3 (TAPE3) into central memory starting at the address of the array DATAMOR

CLOSING A FILE

CLOSMS writes the master index from central memory to the file and closes the file. CLOSMS is provided to close a file so that it can be returned to the operating system before the end of a FORTRAN run, to preserve a file created by an experimental job that might subsequently abort, or for other special purposes. In an overlay program, a mass storage file must be closed explicitly by CLOSMS.

CALL CLOSMS (u)

u Unit designator

Example:

```
CALL CLOSMS (2)
```

This statement closes the file TAPE2.

SPECIFYING A DIFFERENT INDEX

STINDX selects a different array to be used as the current index to the file. The call permits a file to be manipulated with more than one index. For example, when the user wishes to use a sub-index instead of the master index, STINDX is called to select the sub-index as the current index. The STINDX call does not cause the sub-index to be read or written; that task must be carried out by explicit READMS or WRITMS calls. It merely updates the internal description of the current index to the file.

CALL STINDX (u,ix,lngth,t)

u — Unit designator.

ix — Name of the array in central memory containing the sub-index (first word address).

lngth — Length of sub-index

for a number index: lngth ≥ (number of entries in sub-index) + 1

for a name index: lngth ≥ 2 * (number of entries in sub-index) + 1

t — Type of index. If omitted, t is the same as the current index.

t = 0 File has a number sub-index

t = 1 File has a name sub-index

Example 1:

```
DIMENSION SUBIX (10)
CALL STINDX (3,SUBIX,10,0)
```

These statements select a new index, SUBIX, for file TAPE3 with an index length of 10. The records referenced via this sub-index use number keys.

Example 2:

```
DIMENSION MASTER (5)
CALL STINDX (2,MASTER,5)
```

These statements select a new index, MASTER, from file TAPE2 with an index length of 5 and index type unchanged from the last index used.

COMPATIBILITY WITH PREVIOUS MASS STORAGE ROUTINES

FORTRAN Extended mass storage routines and the files they create are not compatible with mass storage routines and files created under versions of FORTRAN Extended before version 4. Major internal differences in the file structure were necessitated by adding the Record Manager interface. However, source programs are fully compatible. Any source program that compiled and executed successfully under earlier versions will do so under this version, provided that all file manipulated by mass storage routines are manipulated only by these routines.

FORTRAN–CYBER RECORD MANAGER INTERFACE

The CYBER Record Manager interface subroutines correspond closely to the CYBER Record Manager COMPASS macros. The names are different in some cases, and the parameters are not necessarily specified in the same order, but the processing performed by each subroutine is for the most part the same as the corresponding COMPASS macro.

Only a summary of the format, parameters, and purpose of each subroutine is given here. The differences in usage of these routines among the five file organizations are not discussed. In order to use these routines, it is necessary to refer to the CYBER Record Manager Guide for Users of FORTRAN Extended.

The user can either allocate buffers within a program block or allow CYBER Record Manager to allocate them dynamically when the file is opened.

To allocate a buffer within the program block, an array must be dimensioned and the length and position of the array specified by the BFS and FWB fields of the file information table. If either of these fields is zero when the file is opened, CYBER Record Manager allocates a buffer in central memory following the executable code and blank common (if declared). In an overlay program, dynamically allocated buffers are assigned to memory beyond the last word address of the longest overlay chain.

These routines are available under NOS/BE 1 and NOS 1, but not under SCOPE 2.

PARAMETERS

The first parameter in the call to every subroutine is the name of the array containing the file information table being processed. This array should be dimensioned 35 words long: 20 words for the file information table itself and 15 for the file environment table. Any other parameters can be omitted; default values are supplied by CYBER Record Manager. With the exception of FILExx, parameters are identified strictly by position; thus, parameters can be omitted only from the right.

When a program is compiled with OPT=2, wsa must be specified on all calls to GET, GETP, and GETN. Also, ka must be specified on calls to GETN and PUT for indexed sequential, direct access, and actual key files.

Most of the parameters establish values for file information table fields. CYBER Record Manager always uses the most recent value established for a field; if a parameter is omitted, the previous contents of the field are used instead.

If the same subroutine is called twice in the same program unit with a different number of parameters, an informative diagnostic is issued by the compiler.

Values for parameters can be:

Array or variable names, identifying areas used for communication between the user program and CYBER Record Manager

Subprogram names for user owncode exits (must be specified in an EXTERNAL statement)

Integer values

L format Hollerith constants, used to express symbolic options and to identify file information table fields

The following mnemonics are used in the subroutine formats below. The precise meaning of any parameter depends on the file organization of the file being processed, as well as the subroutine being called. Not all parameters are applicable to all file organizations.

fit — Name of array containing file information table. Linked to the actual file by means of the LFN field

wsa — Working storage area. A variable, array, or array element name indicating the starting location from which data is to be read or into which data is to be written.

pd — Processing direction established when file is opened:

- 5LINPUT — Read only
- 6LOUTPUT — Write only
- 3LI-O — Read and write
- 3LNEW — File creation (indexed sequential, direct access, actual key only)

of — File positioning at open time:

- 1LR — Rewind
- 1LN — *No file positioning*
- 1LE — Extend; file is positioned immediately before end of information

cf — File positioning after close:

- 1LR — Rewind
- 1LN — No positioning
- 1LU — Unload

type Type of close (not a file information table field):

4LFILE	File close
6LVOLUME	Volume close

ka Location of key for access to record in a direct access, indexed sequential, or actual key file. For GETN, key is returned to this location.

wa Location of word address for read or write of record in a word addressable file.

kp Character position (0 through 9) within word designated by ka in which key begins (direct access, indexed sequential only).

mkl Major key length (indexed sequential only).

rl Record length in characters for record to be read or written.

ex Name of user owncode error exit subroutine.

dx Name of user owncode data exit subroutine.

pos For duplicate key processing:

1LP	Write record preceding current record
1LN	Write record as next record
1LC	Delete or replace current record
0	Delete or replace first record in duplicate key chain

count Number of records to be skipped; positive count indicates forward skip, negative count indicates backward skip, zero count should not be used.

ptl Number of characters to be used for a partial read or write.

skip Positioning before execution of GETP:

0	Continue reading at current position
4LSKIP	Skip to beginning of next record before reading

lev Level number for end of section; 0 to 17.

SUBROUTINES

In the subroutine formats below, braces are used to indicate that more than one parameter occupies the same position. *In all cases, these parameters are applicable to mutually exclusive file organizations.*

CALL FILExx (fit, keyword$_1$, value$_1$, . . . ,keyword$_n$, value$_n$)

xx is SQ (for sequential files), IS (for indexed sequential files), DA (for direct access files), AK (for actual key files) or WA (for word addressable files)

All parameters, with the exception of fit, are paired. The first parameter in each pair is the name of a file information table field, in L format. The second parameter of each pair is the value to be set in that field. CALL FILExx must be executed before the file is opened.

CALL STOREF (fit, keyword, value)

STOREF specifies a value for a single file information table field. It can be called before or after the file is opened. The keyword is the name of a file information table field, in L format, and value is the value to be placed in that field.

IFETCH(fit,field)

IFETCH is an integer function that returns the current value of a single file information table field. A one-bit field is returned in the sign bit; if the bit is 1, the value of the function is negative, if the bit is 0, the value of the function is positive.

CALL OPENM(fit,pd,of)

OPENM opens a file and prepares it for further processing. Only FILExx, STOREF, and IFETCH can precede execution of CALL OPENM.

CALL CLOSEM (fit,cf,type)

CLOSEM closes the file after all processing has been completed. Only STOREF and IFETCH can follow execution of CLOSEM.

CALL GET(fit,wsa, $\left\{\begin{matrix}\text{ka}\\\text{wa}\end{matrix}\right\}$**,kp,mkl,rl,** $\left\{\begin{matrix}\text{ex}\\\text{dx}\end{matrix}\right\}$**)**

GET reads a record and returns it to the working storage area (wsa). The last parameter specifies dx for sequential files, ex for all other files.

CALL PUT(fit,wsa,rl, $\left\{\begin{matrix}\text{ka}\\\text{wa}\end{matrix}\right\}$**,kp,pos,ex)**

PUT writes a record to the file from the working-storage area (wsa).

CALL GETP(fit,wsa,ptl,skip,dx)

GETP reads a partial record. The number of characters to be read is indicated by ptl.

CALL PUTP(fit,wsa,ptl,rl,ex)

PUTP writes a partial record. The number of characters to be written by this write is indicated by ptl, the total number of characters to be written is given by rl (required only for record types U, W, and R).

CALL GETN(fit,wsa,ka,ex)

GETN reads the next record in sequential order from an indexed sequential, direct access, or actual key file. The key of the record read is placed in ka after the read.

CALL DLTE(fit,ka,kp,pos,ex)

DLTE deletes a record from an indexed sequential, direct access, or actual key file. The key of the record to be deleted is in the location specified by ka.

CALL REPLC(fit,wsa,rl,ka,kp,pos,ex)

REPLC replaces a record on an indexed sequential, direct access, or actual key file. The key of the record to be replaces is in the location specified by ka, the new record is in the working storage area indicated by wsa.

CALL CHECK(fit)

CHECK determines whether input output operations on a file are complete and upon completion returns control.

CALL WEOR(fit,lev)

WEOR terminates a section or partition, or S type record.

CALL WTMK(fit)

Writes a tape-mark (equivalent to end of partition).

CALL ENDFILE(fit)

Writes an end of partition.

CALL REWND(fit)

REWND positions a tape file to the beginning of the current volume. It positions a mass storage file to the beginning of information.

ERROR CHECKING

CYBER Record Manager interface routines perform limited error checking to determine whether the call can be interpreted, but actual parameter values are not checked.

FILE INFORMATION TABLE PARAMETERS E

Table E-1 shows the format of the file information table. A complete explanation of the meaning of all fields appears in the Record Manager Reference Manual.

Remaining tables describe most FIT fields pertinent to application programs for the various file organizations. Other parameters may be applicable under special circumstances, particularly for systems programmer uses

Table E-1 File Information Table

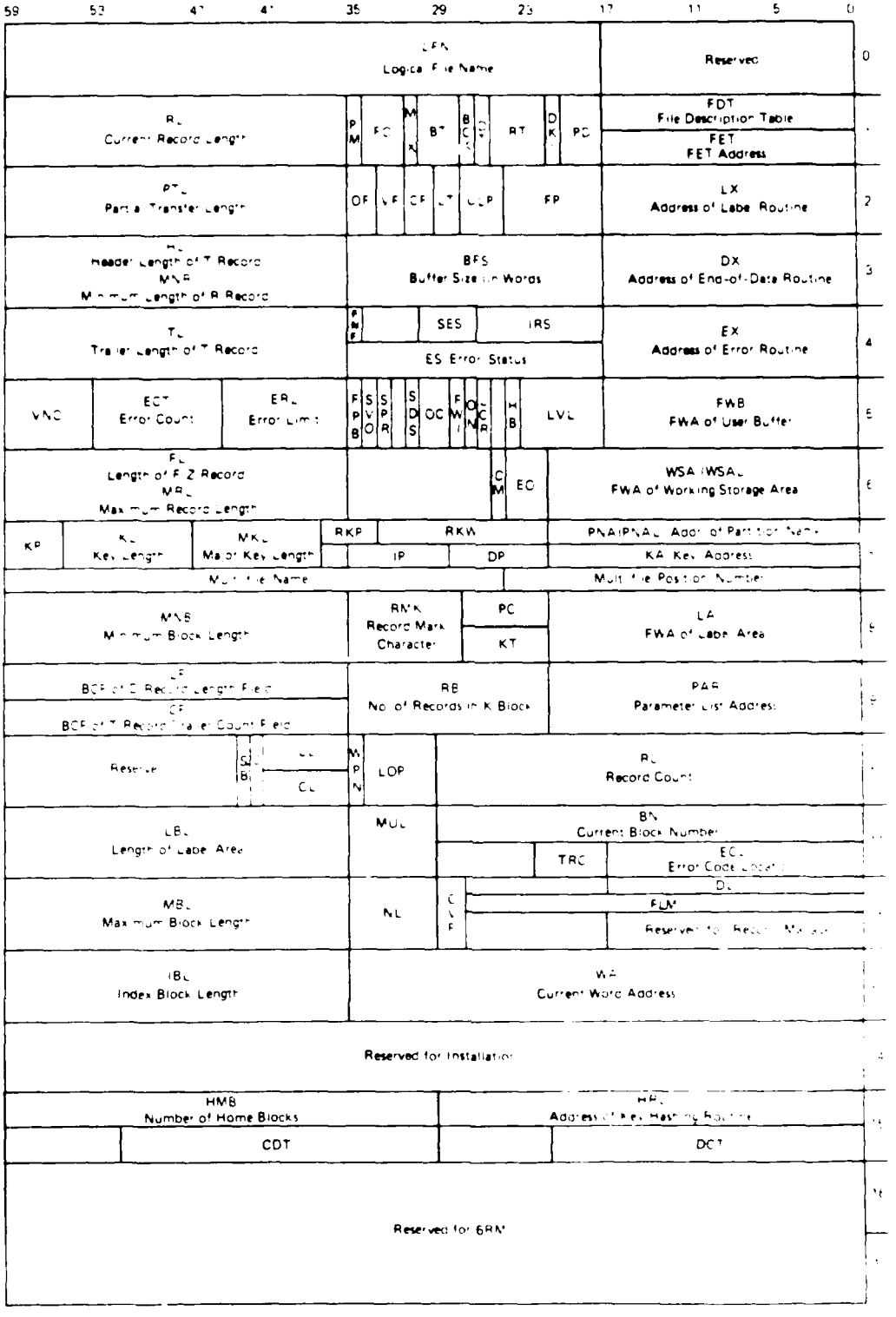

Table E-4. Direct Access Files

FIT Field Mnemonic	Meaning	Allowable Values†	Released Default If Any	Change After Creation	Notes	FILE Card	FILE Statement
BCK	Block checksums?	YES,NO	NO		Can suppress read sum but not write Fetch return: NO=0, YES=1	X	X
BFS	Buffer length, words		RM	yes		X	X
CL	RT=T trailer count field length	$1 \leq 6$	0	no		X	X
CP	RT=T trailer count field start	$0 \leq 10(2^{17}-1)$	0	no		X	X
ECT	Non-fatal error count				Read only		
ERL	Non-fatal error limit	$0 \leq 511$	0(inf)	yes	0 suppresses messages also	X	X
EX	Error exit	routine name	0	yes			X
FET	FET location	program location	RM	yes			X
FL	RT=F,Z record length	$1 \leq 2^{17}-1$		no		X	X
FLM	Maximum file records	$0 \leq 2^{29}-1$	0(inf)		Store directly	X	
FO	File organization	DA	required	no	Fetch return DA=5	X	X
FP	File position				Read only; Fetch return: BOI=1 EOI=100		
FPB	User bit	0,1			User sets and reads		
FWI	Flush buffer immediately?	YES, NO	NO	yes	Fetch return: NO=0, YES=1	X	X
FWB	BFS buffer location	program location	RM	yes			X
HL	RT=T fixed header length	$1 \leq 10(2^{17}-1)$	0	no		X	X
HMB	Number of home blocks	$1 \leq 2^{36}-1$	required	no		X	X
HRL	User hashing routine	routine name	0	no			X
IRS	Invalid request code				Fetch returns octal code: read only		
KA	Key program location	program location		yes	For delete, GETN, seek only		X
KL	Key length	$1 \leq$ MRL	0	no		X	X
KP	Key start in KA	$0 \leq 9$	0	yes		X	X
LFN	Logical file name	1-7 letters or digits; letter start	required	yes		X	X
LL	RT=D length field length	$1 \leq 6$	0	no		X	X
LP	RT=D length field start	$0 \leq$ MRL	0	no		X	X
MBL	Home block length	$1 \leq 10(2^{17}-1)$	5110	no	RM may calculate	X	X
MNR	Minimum record length	$1 \leq$ MRL	required	no		X	X
MRL	Maximum record length	$1 \leq 10(2^{17}-1)$	required	no		X	X
OVF	Overflow record residence	OVO,OVB,OVH	OVB	no		X	

Table E-4. Direct Access Files (continued)

FIT Field Mnemonic	Meaning	Allowable Values†	Released Default If Any	Change After Creation	Notes	FILE Card	FILE Statement
PD	Processing direction	INPUT, OUTPUT I O, NEW	INPUT		New required to create; Fetch return: INPUT=0, OUTPUT=2, I-O=3		X
PM	Processing mode	R,S	R	yes	Set with Store, Fetch return: R=0, S=1	X	
RB	Number records per block	$1 \leq 2^{12}-1$	2		MBL overrides RB	X	X
RKP	Relative key position in RKW	$0 \leq 9$	0	no		X	X
RKW	Relative key position in record	$0 \leq$ MRL	0	no		X	X
RL	Current record length	$1 \leq$ MRL	0				
RMK	RT=R record mark character	any character	62 octal	no	Specify octal	X	X
RT	Record type	W,F,R,Z,D,T,U,S	W	no		X	X
SDS	Statistics on dayfile?	YES, NO	NO	yes	ZZZZZEF if NO	X	X
TL	RT=T trailer length	$1 \leq 10(2^{17}-1)$				X	X
TRC	Number of trace transaction	0 (none), $1 \leq 31$, 31 (all)	0	yes			X
WSA	Working storage area	program location	required	yes			X

†RM Record Manager provides by default

SUBROUTINE 'UNLOAD'

PURPOSE
   UNLOAD A FORTRAN FILE

FUNCTIONAL CATEGORY: 04

USAGE
   CALL UNLOAD (IOUNIT)

DESCRIPTION OF PARAMETER
   IOUNIT - FORTRAN LOGICAL UNIT NUMBER

REMARKS
   THE FILE TO BE UNLOADED MUST BE LISTED IN THE FORTRAN
   PROGRAM STATEMENT. FOR NON-STANDARD FILES, SEE 'CLUNLD'.

   FORTRAN SEQUENTIAL FILES SHOULD HAVE THEIR BUFFERS FLUSHED
   BY ISSUING A REWIND BEFORE CALLING THIS ROUTINE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      NONE
   OTHERS
      CLUXXX - UNLOAD A FILE

LANGUAGE: FORTRAN IV EXTENDED

CM REQUIRED: 218

AUTHOR
   DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/75

DATE(S) REVISED

LOCATION OF DECKS
   SOURCE
      UPDATE LIBRARY: NSRDCPL.IO=CSYS
   OBJECT
      EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ZPFUNC'

PURPOSE
CALLABLE PERMANENT FILE FUNCTIONS

USAGE
CALL ZPFUNC (IRC, IPRMS, NW)

DESCRIPTION OF PARAMETERS
IRC - INPUT: PERMANENT FILE FUNCTION DESIRED
1 - ATTACH
2 - CATALOG
3 - EXTEND
4 - PURGE
5 - RENAME
6 - PERM
OUTPUT: ERROR RETURN CODE
(EITHER ZPFUNC- OR SCOPE-GENERATED)

ZPFUNC-GENERATED

IRC	MEANING
-1	IRC HAD ILLEGAL INPUT VALUE
-2	LAST CHARACTER OF AC IS NOT DISPLAY CODE NUMERIC

SCOPE-GENERATED

DEC	OCT	COMND	MEANING
0	000	ALL	FUNCTION SUCCESSFUL
1	001		ID ERROR
2	002	A,P	LFN ALREADY IN USE
3	003	CEPR	UNKNOWN LFN
4	004	C	TOO MANY CYCLES (5 MAX)
5	005	C,E	PF CATALOG FULL
6	006		NO LFN OR PFN
8	010	C,E	LATEST INDEX NOT WRITTEN
9	011	C	FILE NOT ON A PF DEVICE
10	012	A	FILE NOT IN SYSTEM
11	013	A	ARCHIVE RETRIEVAL ABORTED
12	014	C,R	INVALID CYCLE NUMBER
13	015	C	CY LIMIT REACHED (999 MAX)
14	016	C	PF DIRECTORY FULL
15	017	CEPR	FUNCTION ATTEMPTED ON A NON-PERMANENT FILE
16	020		FCN ATTEMPTED ON NON-LOCAL FILE
18	022	C	FILE NEVER ASSIGN TO A DEVICE
19	023	A	CYCLE INCOMPLETE OR DUMPED
20	024	A	FILE ALREADY ATTACHED
21	025	A	FILE UNAVAILABLE
23	027		ILLEGAL LFN
24	030	A	FILE DUMPED
27	033		ALTER NEEDS EXCLUSIVE ACCESS
29	035	C	FILE ALREADY IN SYSTEM
56	070		PFM STOPPED BY SYSTEM
57	071		SECURITY VIOLATION
58	072		FILE DEFINITION BLOCK ADDRESS

IPRMS - PARAMETERS FOR PF FUNCTION

IPRMS	CONTENTS	FUNCTIONS	FORMAT
1	LFN	ALL	1-7 CHAR, LEFT* (IF 0, 1ST 7 CHAR OF PFN ARE USED (A,C,P)
2-5	PFN	A,C,P,R	1-40 CHAR, LEFT
6	ID	A,C,P,R	1-9 CHAR, LEFT
7	TK	**,***	1-9 CHAR, LEFT
8	RD	**,***	1-9 CHAR, LEFT
9	EX	**,***	1-9 CHAR, LEFT
10	MD	**,***	1-9 CHAR, LEFT
11	CN	**,***	1-9 CHAR, LEFT
12	MR	A,C	0 OR NOT
13	AC	C,R****	10 CHAR (LAST IS NUMERIC
14	CY	A,C,P,R	INTEGER (1-999) NEGATIVE TO RETURN VALUE
15	RP	C,R	INTEGER (0-999)
16	XR	C,R ***	1-9 CHAR, LEFT
17	LC	A,P	0 OR NOT
18	RW	A,C	0 OR NOT
19	SN	A,P	1-7 CHAR, LEFT
20	VS		VOLUME SERIAL NUMBER (RESERVED FOR FUTURE)
21	FO	C	2-CHAR, LEFT (DA, IS, AK)
22	ST		STATION ID (MULTI-FRAME) (RESERVED FOR FUTURE)

A=ATTACH; C=CATALOG; P=PURGE; R=RENAME

* LEFT=LEFT-JUSTIFIED, BLANK OR ZERO PADDED

** FOR A,P, INTERPRETED AS SUBMITTED PASSWORD
FOR C, USED AS BOTH DEFINITION AND SUBMITTED PW

*** FOR R, WHEN SET TO 1, THE PASSWORD IS CLEARED

**** FOR C, WHEN OMITTED, AC IS TAKEN FROM CHARGE CARD OR LOGIN

NW - NUMBER OF LAST FILLED ELEMENT IN IPRMS (OPTIONAL)

REMARKS
NONE

```
SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED
   PART OF LANGUAGE
      AND        SHIFT
   OTHERS
      IZPFHIZ
      IZRI9ZN
      NUMVAR
      ZPFMAC
      ZPFPSW

CM REQUIRED: 445B

AUTHOR
   C M CHERNICK - NSRDC CODE 1832

DATE WRITTEN: 01/75

DATE(S) REVISED
   05/75      01/02/76

LANGUAGE: FORTRAN IV EXTENDED

FUNCTIONAL CATEGORY:     Q3

LOCATION OF DECKS
   SOURCE
      CODE 1832
   OBJECT
      EDITLIB USER LIBRARY:    NSRDC
```

EXAMPLE

```
      PROGRAM TEST (INPUT, OUTPUT, TAPE5=INPUT, TAPE6=OUTPUT
      DIMENSION IPRMS(22)
      DATA LFN   / 6LMYFILE/
      DATA ID    / 4LCXXX/
      DATA IPFN1, IPFN2/ 10HPERMANENTF, 3HILE/
      DATA IAC   / 10H9876543210/          (SEE NOTE BELOW)
      DATA IPW   / 8LPASSWORD/

         . . .

      DO 10 I=1,22
   10 IPRMS(I) = 0
      IPRMS( 1) = LFN
      IPRMS( 2) = IPFN1
      IPRMS( 3) = IPFN2
      IPRMS( 6) = ID
      IPRMS( 7) = IPW
      IPRMS(13) = IAC                      (SEE NOTE BELOW)
      IRC = 2
      NW  = 13
      CALL ZPFUNC (IRC, IPRMS, NW)
      IF (IRC .NE. 0) WRITE (6, 20) IRC, IRC
   20 FORMAT (*0ERROR - IRC=* I7, * (OR * O3, *B*)

         . . .

      STOP
      END
```

THIS PROGRAM IS EQUIVALENT IN EFFECT TO THE FOLLOWING CONTROL CARDS:

```
CATALOG(MYFILE,PERMANENTFILE,ID=CXXX,AC=9876543210,
        PW=PASSWORD)
```

FOR A NEW CYCLE OF AN EXISTING FILE:

```
CATALOG(MYFILE,PERMANENTFILE,ID=CXXX,AC=9876543210,
        PW=PASSWORD)
```

FOR THE CREATION OF A NEW FILE.

NOTE: IF THESE TWO LINES ARE OMITTED (THAT IS, AC IS ZERO), AC WILL BE TAKEN FROM THE BATCH CHARGE CARD OR THE INTERCOM LOGIN.

APPENDIX D

MPP CALLS TO SITE DEPENDENT SOFTWARE

Appendix D presents full FORTRAN compilation listings of all program elements that reference possible site dependent software from program MPP. These listings are included to assist the user in the event major modifications are needed when adapting to the appropriate subroutine calls at the bench mark site.

```
      SUBROUTINE CTL2                                                   CTL2       2
      COMMON KLKL(5,80),KK,KL(80)                                       CTL2       3
     *     ,INFILE,DB150,NOPRNT(5),NOPTS(5),OUTAPE,INDISC(5),           CTL2       4
     *     FREQR(6,10,5),LINFLT,NDEPS,IOPT(10,5),ENDX,TANG(160),        CTL2       5
     *     IFXHP(80),JDISC(5),JPRNT,KPRNT,BEGINX,MO,INTAPE,NRAYP,       CTL2       6
     *    JBEGNP,IBEGNP                                                 CTL2       7
      DIMENSION LINFLG(3)                                               CTL2       8
      DIMENSION NARV(5),INDIC(6)                                        CTL2       9
      EQUIVALENCE (IARV,INDIC(1)),(IMOR7,INDIC(2)),(ISURF,INDIC(3)),    CTL2      10
     1           (IBOT,INDIC(4)),(IRD,INDIC(5)),(JLINE,INDIC(6))       CTL2      11
      DIMENSION RI(5,150) ,ANGLE(5,150),ISIG(5,150),TI(5,150)           CTL2      14
      DIMENSION ISEQ(30),NCS(5,150),XI(5,150)                           CTL2      15
C                                                                       15AUG78   36
C        THE FOLLOWING SPECIFICATION STATEMENTS APPLY TO THE ELEMENTS   15AUG78   37
C        REQUIRED TO ACCESS THE OLD AND NEW ARRIVALS DIRECT ACCESS      15AUG78   38
C        FILES, RESPECTIVELY.                                           15AUG78   39
C***********************************************************************15AUG78   40
C                                                                       15AUG78   41
      DIMENSION OLDFIT(35), ARVRE2(7), IARVR2(7)                        15AUG78   42
      DIMENSION NEWFIT(35), ARVREC(7), IARVRC(7)                        15AUG78   43
C                                                                       15AUG78   44
      EQUIVALENCE (ARVREC,IARVRC), (ARVRE2,IARVR2)                      15AUG78   45
      EQUIVALENCE (KEYOLD,ARVRE2(1)), (KEYNEW,ARVREC(1))               15AUG78   46
C                                                                       15AUG78   47
      INTEGER OLDFIT                                                    15AUG78   48
C                                                                       15AUG78   49
C***********************************************************************15AUG78   50
C                                                                       CTL2      23
C                                                                       CTL2      24
      COMMON/OLDARV/KLK2(5,80)                                          CTL2      25
C                                                                       CTL2      26
C                                                                       CTL2      27
C                                                                       QUAN       2
      COMMON/ QUANTS /AB(202),BB(202),CC(202),BC(202),AC(202),          QUAN       3
     1                ALPHR(202),GRAD(202),YBORY(203)                  QUAN       4
C          COMMON QUANTS CONTAINS QUANTITIES COMPUTED BY CFIELD THAT     QUAN       5
C          GIVE INFORMATION ABOUT THE SECTORS IN A PARTICULAR REGION     QUAN       6
C                                                                       QUAN       7
      COMMON /XRANGE/XBDRY                                              CTL2      30
      COMMON /NMORZ/NMOR7                                               CTL2      31
      COMMON /NRAD/NP                                                   CTL2      32
      COMMON/CORCUT/NUMSEC                                              CTL2      33
      COMMON/C      PROFILE,SPCFILE,CONFILE,QANFILE,NUMPRO,NUMCON,NUMQAN CTL2      34
      INTEGER C     E,PROFILE,SPCFILE,CONFILE                           CTL2      35
      COMMON /BREAK/ NBRK,ANGBRK(80)                                    CTL2      36
      COMMON/RAYS/NANGLE,THEO(160),IFXH(160)                            CTL2      37
      COMMON /PLTIN/ ANGMAX,ANGMIN,NX,NY,NI                             CTL2      38
      COMMON /PLTINF/ IFMIC,NRTCAL,NPLOT,RPLOT(31)                      CTL2      39
      COMMON /DEPTHS/ BEGINY,IOPTN                                      CTL2      40
      COMMON/SCALEF/NTLPLT,ORPLT,TLMIN,TLMAX,NRX,NCBY                   CTL2      41
      COMMON /ROTREF/ XO,YO,X1,Y1,CO,THETAO,C1,T1,DT,PSI,SINPO,RAD,AL,BL CTL2      42
      COMMON/BOTTOM/DEP(62),RANGE(62),ABOT(62),BBOT(62),NBP             CTL2      43
      COMMON/BBB/YDEP(5),RTCAL(20)                                      CTL2      44
      COMMON /FINPUT/ FSAVE(30),NFREQ,NF,IIBOT,KBOT,NKBOT,IPTR,KPTR     CTL2      45
C                                                                       CTL2      46
      EQUIVALENCE (ITON, INTAPE)                                        CTL2      47
C                                                                       CTL2      49
```

```
                C          DIMENSION ROTLOS(30) USED TO BE HERE                                  CTL2       50
                C                                                                                CTL2       51
     60               LOGICAL NO21                                                               CTL2       53
                      INTEGER OUTAPE                                                             CTL2       54
                      INTEGER TRAJCT                                                             CTL2       56
                      INTEGER OLDTRJ                                                             CTL2       57
                      INTEGER OLDIIB                                                             CTL2       58
     65               INTEGER OLDIDI                                                             CTL2       59
                C                                                                                CTL2       60
                      DATA IO1,IO2,IO3,IO4/1B,400B,200000B,10000000000B/                         CTL2       61
                      DATA IWORDS/30/                                                            CTL2       62
                      DATA RNEG/-1.0/                                                            CTL2       63
     70               C                                                                          CTL2       64
                C          THE FILE TRAJCT WILL CONTAIN THE TRAJECTORIES.                        CTL2       65
                C          THE FILE OLDTRJ WILL CONTAIN THE PREVIOUSLY TRACED RAYS(IF            CTL2       66
                C        ANY).                                                                   CTL2       67
                C          THE FILE OLDIDI WILL CONTAIN THE SEQUENTIAL SIGNATURES FROM           CTL2       68
     75         C               A PREVIOUS RUN IF THIS IS A PICK-UP RUN.                         CTL2       69
                C          THE FILE OLDIIB WILL CONTAIN THE BOTTOM BOUNE RANGE AND ANGLE         CTL2       70
                C               FROM A PREVIOUS RUN IF THIS IS A PICK-UP RUN.                    CTL2       71
                C                                                                                CTL2       72
                      DATA OLDTRJ/21/                                                            CTL2       73
     80               DATA TRAJCT/20/                                                            CTL2       74
                      DATA OLDIDI/23/                                                            CTL2       75
                      DATA OLDIIB/24/                                                            CTL2       76
                C                                                                                CTL2       77
                C          1.1 DATA INPUT AND INITIALIZATION                                     CTL2       78
     85         C                                                                                CTL2       79
                C          1.1.1 INITIALIZATION OF CONSTANTS AND LIMITS ON EVENTS FOR            CTL2       80
                C          THE RAY TRACE                                                         CTL2       81
                C          ANGMXT =  MAXIMUM ALLOWED RAY ANGLE                                   CTL2       82
                C          INTCUT =  MAXIMUM NUMBER ARRIVALS                                     CTL2       83
     90         C          NBRMAX =  MAXIMUM NUMBER OF BOTTOM REFLECTIONS                        CTL2       84
                C          KCUT   =  MAXIMUM NUMBER OF REVERSALS                                 CTL2       85
                C          NTRAJ  =  THE NUMBER OF THE NEXT TRAJECTORY TO BE READ FROM           CTL2       86
                C                    DISK.IF THIS IS A PICKUP FROM ANOTHER RUN.THE               CTL2       87
                C                    OPTION TO USE PREVIOUSLY COMPUTED RAY DATA MAY HAVE         CTL2       88
     95         C                    BEEN CHOSEN.SO CERTAIN TRAJECTORIES WILL BE COPIED          CTL2       89
                C                    FROM THE OLD TRAJECTORY FILE (OLDTRJ) TO THE NEW            CTL2       90
                C                    ONE (TRAJCT).                                               CTL2       91
                C                                                                                CTL2       92
                C                                                                                CTL2       93
    100         C       OTHER VARIABLES-                                                         CTL2       94
                C                                                                                CTL2       95
                C                                                                                CTL2       96
                C          KLKL(I,J) - THE NUMBER OF ARRIVALS OF THE J-TH RAY AT THE             CTL2       97
                C                      I-TH SOURCE DEPTH.                                        CTL2       98
    105         C          INTAPE-FLAG SET NON-ZERO IF THIS IS A PICK UP RUN.                    FIXFOR      1
                C          NO21   - IF THIS IS A SUBSEQUENT RUN (INTAPE=1) AND TAPE21            CTL2       99
                C                   HAS NOT BEEN ATTACHED.THEN NO21 IS SET TO .TRUE.             CTL2      100
                C          NOLDIS - IF THIS IS A SUBSEQUENT RUN (INTAPE=1)NOLDIS WILL            CTL2      101
                C                   KEEP TRACK OF THE NEXT RECORD ON FILE OLDIDI TO BE           CTL2      102
    110         C                   READ AND THE NEXT SET OF 25 RECORDS ON FILE OLDIIB           CTL2      103
                C                   TO BE READ.                                                  CTL2      104
                C          NP     -NO. OF PROFILES ON DISK.                                     FIXFOR      2
                C          NREGS  -NO. OF REGIONS BETWEEN PROFILES.                             FIXFOR      3
                C                                                                                CTL2      105
```

```
      C                                                                 CTL2   106
      C                                                                 CTL2   107
      C                                                                 CTL2   112
            NREGS=NP-1                                                  CTL2   113
      C                                                                 CTL2   114
      C                                                                 CTL2   115
      C           IDISC = FILE FOR ARRIVALS.                            CTL2   116
      C           IIBOT= FILE FOR BOTTOM STRUCTURE.                     CTL2   117
      C                                                                 CTL2   118
      C                                                                 CTL2   119
            IDISC=13                                                    CTL2   120
            IIBOT=18                                                    CTL2   121
            RADIAN        =   0.017453293                               CTL2   122
            ANGMXT  =  85.*RADIAN                                       CTL2   123
            INTCUT = 149                                                CTL2   124
            NARMAX = 25                                                 CTL2   125
            KCUT = 254                                                  CTL2   126
            NSHAR = 127                                                 CTL2   127
            X1 = 0.00                                                   CTL2   128
            NTRAJ=0                                                     CTL2   129
            NOLDIS=0                                                    CTL2   130
            NGETS = 0                                                   15AUG78  51
            NPUTS = 0                                                   15AUG78  52
      C                                                                 CTL2   131
      C                                                                 CTL2   132
      C        IF INTAPE .GT. 0, OPEN THE OLD DIRECT ACCESS FILE.       15AUG78  53
      C                                                                 CTL2   134
      C                                                                 CTL2   135
            IF(INTAPE .LE. 0) GO TO 80                                  CTL2   136
      C                                                                 CTL2   137
      C                                                                 CTL2   138
      C                                                                 15AUG78  54
      C ***************************************************************15AUG78  55
      C        OPEN OLD ARRIVALS FILE                                   15AUG78  56
      C ***************************************************************15AUG78  57
      C                                                                 15AUG78  58
            CALL FILEDA(OLDFIT,3LLFN,6LGRPAR2,2LFO,2LDA,2LRT,1LF,3LMRL,70,  15AUG78  59
           *            3LMNR,70,2LRA,500,3LMMA,100,2LKL,10,2LKT,1LI)    15AUG78  60
      C                                                                 15AUG78  61
            CALL OPENM(OLDFIT,5LINPUT)                                  15AUG78  62
      C                                                                 CTL2   143
      C                                                                 CTL2   144
       80   CONTINUE                                                    CTL2   145
      C                                                                 CTL2   146
      C        OPEN THE NEW DIRECT ACCESS FILE FOR WRITING COMBINED ARRIVAL 15AUG78  63
      C        DATA ARRAYS                                              15AUG78  64
      C                                                                 15AUG78  65
      C ***************************************************************15AUG78  66
      C        OPEN NEW ARRIVALS FILE                                   15AUG78  67
      C ***************************************************************15AUG78  68
      C                                                                 15AUG78  69
            CALL FILEDA(NEWFIT,3LLFN,6LGRPARV,2LFO,2LDA,2LRT,1LF,3LMRL,70,  15AUG78  70
           *            3LMNR,70,2LRA,500,3LMMA,100,2LKL,10,2LKT,1LI)    15AUG78  71
      C                                                                 15AUG78  72
            CALL OPENM(NEWFIT,3LNEW)                                    15AUG78  73
      C                                                                 CTL2   150
      C                                                                 CTL2   151
```

```
                C          WRITE BOTTOM PROFILE AS FIRST RECORD TO FILE TRAJCT SO THAT   CTL2  152
                C        THE BOTTOM PROFILE CAN BE PLOTTED ON THE TRAJECTORY PLOT.       CTL2  153
                C                                                                        CTL2  154
      175       C                                                                        CTL2  155
                C                                                                        CTL2  156
                      WRITE(TRAJCT) NRP,(RANGE(IU),DEP(IU),IU=1,NBP)                     CTL2  157
                      NO21=.FALSE.                                                       CTL2  158
                      IF(INTAPE .EQ. 0) GO TO 90                                         CTL2  159
      180             REWIND OLDTRJ                                                      CTL2  160
                      READ(OLDTRJ)DUM                                                    CTL2  161
                      IF(EOF(OLDTRJ)) 85,90                                              CTL2  162
                   85 NO21=.TRUE.                                                        CTL2  163
                      WRITE(6,87)                                                        CTL2  164
      185          87 FORMAT(1H1,* TAPE21 WAS NOT ATTACHED.THE RUN IS OK BUT THE TRAJECT CTL2  165
                     1ORY FILE (TAPE20) IS NOT VALID.*)                                  CTL2  166
                   90 CONTINUE                                                           CTL2  167
                      REWIND OLDTRJ                                                      CTL2  168
                C                                                                        CTL2  169
      190       C                                                                        CTL2  170
                C                                                                        CTL2  171
                C     ***************************************************************  CTL2  172
                C                                                                        CTL2  173
                C         1.2 TRACING RAYS                                               CTL2  174
      195       C                                                                        CTL2  175
                C     ***************************************************************  CTL2  176
                C                                                                        CTL2  177
                      DO 940  I     =   1,NANGLE                                       CTL2  178
                      WRITE(6,95) I                                                      CTL2  179
      200          95 FORMAT(* PROCESSING RAY *,I3)                                     CTL2  180
                C                                                                        CTL2  181
                C         1.2.1 DEPENDING ON IANG(JDA), GO TO TRACE SECTION (260), OR   CTL2  182
                C         READ ARRIVAL INFORMATION FOR RAY AT ALL DEPTHS OFF INPUT      CTL2  183
                C         TAPE SKIPPING TO NEXT RAY (240) OR TO SECTION FOR PROCESSING  CTL2  184
      205       C         ARRIVALS OF ONE RAY (840) WHERE INFORMATION IS WRITTEN        CTL2  185
                C         ONTO SEPARATE DISKS, ONE FOR EACH SOURCE DEPTH                CTL2  186
                C                                                                        CTL2  187
                      IF(IANG(I) .EQ. 0) GO TO 260                                       CTL2  188
                C                                                                        CTL2  189
      210       C                                                                        CTL2  190
                C           READ IN OLD TRAJECTORY AND WRITE IT TO THE NEW TRAJECTORY    CTL2  191
                C         FILE.                                                          CTL2  192
                C                                                                        CTL2  193
                C                                                                        CTL2  194
      215       C           RECALL:-THE FIRST RECORD IS THE BOTTOM PROFILE.              CTL2  195
                C                                                                        CTL2  196
                C                                                                        CTL2  197
                C           MAYBE YOU NEVER SAVED THE OLD TRAJECTORY.                    CTL2  198
                      IF(NO21) GO TO 200                                                 CTL2  199
      220       C                                                                        CTL2  200
                      IF(NTRAJ .NE. 0) GO TO 180                                         CTL2  201
                      NTRAJ=1                                                            CTL2  202
                      READ(OLDTRJ)OLDR                                                   CTL2  203
                  180 IF(NTRAJ .NE. IANG(I)) GO TO 190                                   CTL2  204
      225       C                                                                        CTL2  205
                C                                                                        CTL2  206
                C           THIS IS A TRAJECTORY WE WANT TO KEEP.                        CTL2  207
                C                                                                        CTL2  208
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      C                                                                 CTL2  209
230    185  READ(OLDTRJ)OLDR,OLDD,OLDANG                               CTL2  210
           WRITE(TRAJCT)OLDR,OLDD,OLDANG                               CTL2  211
           IF(OLDR .GE. 0.0) GO TO 185                                 CTL2  212
           NTRAJ=NTRAJ+1                                               CTL2  213
           GO TO 200                                                   CTL2  214
235   C                                                                CTL2  215
      C                                                                CTL2  216
      C         THIS IS THE TRAJECTORY FROM AN INITIAL ANGLE THAT WAS  CTL2  217
      C       DELETED.                                                 CTL2  218
      C                                                                CTL2  219
240    190  READ(OLDTRJ)OLDR                                           CTL2  220
           IF(OLDR .GE.0.0) GO TO 190                                  CTL2  221
           NTRAJ=NTRAJ+1                                               CTL2  222
           GO TO 180                                                   CTL2  223
      C         RECALL:- NEGATIVE TRAJECTORY SIGNALS THE END OF A RAY. CTL2  224
245   C                                                                CTL2  225
      C                                                                CTL2  226
      C ***************************************************************CTL2  227
      C                                                                CTL2  228
      C       ACCESS PREVIOUSLY CREATED DIRECT ACCESS FILE HERE.       15AUG78  74
250   C                                                                CTL2  230
      C                                                                CTL2  231
      C ***************************************************************CTL2  232
       200  CONTINUE                                                   CTL2  233
      C                                                                CTL2  234
255   C                                                                CTL2  235
      C         INDEXR - INDEX OF RAY AMONG ORIGINAL SET OF RAYS ON DISK.CTL2  236
      C         KLK2(KK,INDEXR) - THE NUMBER OF ARRIVALS OF RAY INDEXR AT CTL2  237
      C                           THE KK-TH SOURCE DEPTH.              CTL2  238
      C                                                                CTL2  239
260         INDEXR=IANG(I)                                             CTL2  240
      C                                                                15AUG78  75
            DO 220 KK=1,NDEPS                                          CTL2  242
              NARRIV=KLK2(KK,INDEXR)                                   CTL2  243
              NARV(KK)=NARRIV                                          CTL2  245
265           ITEMP = INDEXR * 10000 + KK * 1000                       15AUG78  76
      C                                                                15AUG78  77
              DO 210 NA=1,NARRIV                                       CTL2  247
             KEYOLD = ITEMP + NA                                       15AUG78  78
            CALL GET(OLDFIT,ARVRE2,KEYOLD,0)                           15AUG78  79
270         NGETS = NGETS + 1                                          15AUG78  80
             RI(KK,NA) = ARVRE2(2)                                     15AUG78  81
             XI(KK,NA) = ARVRE2(3)                                     15AUG78  82
             ANGLE(KK,NA) = ARVRE2(4)                                  15AUG78  83
             ISIG(KK,NA) = IARVR2(5)                                   15AUG78  84
             TI(KK,NA) = ARVRE2(6)                                     15AUG78  85
275          NCS(KK,NA) = IARVR2(7)                                    15AUG78  86
       210    CONTINUE                                                 CTL2  257
       220  CONTINUE                                                   CTL2  258
      C                                                                CTL2  259
280   C                                                                CTL2  260
      C         NOW GET THE PROPER SEQUENTIAL SIGNATURE DATA.          CTL2  261
      C                                                                CTL2  262
      C                                                                CTL2  263
       240  READ(OLDID(I))(ISEQ(KK),KK=1,IWORDS)                       CTL2  264
285         NOLDIS=NOLDIS+1                                            CTL2  265
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      IF(NOLDIS .EQ. INDEXR ) GO TO 255                                  CTL2   266
C                                                                        CTL2   267
C          WE DO NOT HAVE THE CORRECT DATA.GET PAST THE 25 BOTTOM        CTL2   268
C        BOUNCE DATA RECORDS.                                            CTL2   269
C                                                                        CTL2   270
      DO 250 KK=1,25                                                     CTL2   271
        READ(OLDIIB)XNM                                                  CTL2   272
 250  CONTINUE                                                           CTL2   273
      GO TO 240                                                          CTL2   274
C                                                                        CTL2   275
C                                                                        CTL2   276
C          WE ARE AT THE CORRECT DATA.                                   CTL2   277
C                                                                        CTL2   278
 255  DO 257 KK=1,25                                                     CTL2   279
        READ(OLDIIB)XNM,PSI                                              CTL2   280
        WRITE(IIBOT)XNM,PSI                                              CTL2   281
 257  CONTINUE                                                           CTL2   282
      GO TO 840                                                          CTL2   283
 260 CONTINUE                                                            CTL2   284
C                                                                        CTL2   285
C         1.2.2 INITIALIZIATION FOR RAYS BEING TRACED                    CTL2   286
C                                                                        CTL2   287
      IF(KPRNT.GT.0) WRITE(6,106)THEO(I),(YDEPTH(II),II=1,NDEPS)         CTL2   288
  106 FORMAT(1H1,44X,10HTRACE FOR ,F9.5,11H DEGREE RAY//                 CTL2   289
     1  17X,*COORDINATES*,40X,*SIGNATURE*,14X,*NO. ARRIVALS AT EACH SOUR FIXFOR   4
     ACE DEPTH*,//,7X,                                                   FIXFOR   5
     2       10H RANGE(NM),3X,10H DEPTH(FT),2X,10H ANGLE(DG),1X          CTL2   291
     3       10H TIME(SEC),10H  LOSS(DB),4X,3H BH,1X,3H BR,1X,3H SH,1X,  CTL2   292
     4   3H SR,2X,3H NC,5X,5F8.1)                                        FIXFOR   6
C                                                                        CTL2   296
C ***********************************************************************9NOV77  10
C                                                                        9NOV77  11
C                              VARIABLES                                 9NOV77  12
C                                                                        9NOV77  13
C ***********************************************************************9NOV77  14
C          IBEGIN-NUMBER OF THE TRIANGULAR SECTOR IN WHICH THE RECEIVER  9NOV77  15
C                APPEARS.                                                9NOV77  16
C          JBEGIN-THE RECEIVER APPEARS BETWEEN PROFILE JBEGIN AND JBEGIN 9NOV77  17
C                +1. (INCLUSIVE OF JBEGIN, EXCLUSIVE OF JBEGIN+1.)       9NOV77  18
C                THAT IS, THE STARTING RANGE FOR THE RAY TRACE IS        9NOV77  19
C                GREATER THAN OR EQUAL TO THE RANGE OF PROFILE JBEGIN    9NOV77  20
C                AND LESS THAT THE RANGE OF PROFILE JBEGIN+1.            9NOV77  21
C          VARIABLES USED DURING TRACE --                                CTL2   297
C                                                                        CTL2   298
C          1. COUNTERS                                                   CTL2   299
C                NBH    = NUMBER OF BOTTOM HORIZONTALS                  CTL2   300
C                NBR    = NUMBER OF BOTTOM REFLECTIONS                  CTL2   301
C                NSH    = NUMBER OF SURFACE HORIZONTALS                 CTL2   302
C                NSR    = NUMBER OF SURFACE REFLECTIONS                 CTL2   303
C                NARV(K) = NUMBER OF ARRIVALS AT SOURCE DEPTH(K)        CTL2   304
C                NC     = NUMBER OF CAUSTICS                            CTL2   305
C                K      = NUMBER OF EVENTS (REVERSALS)                  CTL2   306
C             2. FLAGS                                                   CTL2   307
C                IFLAG2 - IS AN INPUT TO AND OUTPUT OF SUBROUTINES       9NOV77  22
C                         LINCIR AND LINLIN.                             9NOV77  23
C                         ON INPUT                                       9NOV77  24
C                            =0 X0,Y0 NOT ON LINE.                       9NOV77  25
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                C                        =1 X0,Y0 ON LINE.                                  9NOV77     26
                C                     ON OUTPUT                                             9NOV77     27
      345       C                        =0 NO VALID INTERSECTION PAST X0,Y0.                9NOV77     28
                C                        =1 INTERSECTION AT XT,YT.                          9NOV77     29
                C                                                                           9NOV77     30
                C              IFXH    = 0 NO EXTRA HORIZONTAL INSERTED IN                  CTL2       308
                C                        SIGNATURE                                          CTL2       309
      350       C                        1 EXTRA HORIZONTAL                                 CTL2       310
                C              LASTEV  = 0 IF LAST EVENT NOT BH                            CTL2       311
                C                        1 IF LAST EVENT BH                                 CTL2       312
                C                        2 IF LAST EVENT BR                                 CTL2       313
                C              LINFLG(1) = SECTOR INDEX IF RAY AT BOUNDARY                  CTL2       314
      355       C                    (2) = SOURCE DEPTH INDEX IF RAY AT SOURCE              CTL2       315
                C                        DEPTH                                              CTL2       316
                C                    (3) = BOTTOM-FACET INDEX IF RAY AT BOTTOM              CTL2       317
                C              THERST  = 0 ZERO DEGREE RAY IN DCDY = 0                      CTL2       318
                C                        1 ANYTHING ELSE                                    CTL2       319
      360       C           3. INITIAL CONDITIONS (STARTING POINT FOR EACH STEP)            CTL2       320
                C                X0      = RANGE (FT)                                       CTL2       321
                C                Y0      = DEPTH (FT)                                       CTL2       322
                C                THETA0  = ANGLE (RADIANS)                                  CTL2       323
                C                PHI0    = ANGLE WITH RESPECT TO ISOVELOCITY                CTL2       324
      365       C                        CONTOURS                                           CTL2       325
                C                TIME    = TRAVEL TIME (SECONDS)                            CTL2       326
                C                TLOSS   = SPREADING PLUS REFLECTION LOSS                   CTL2       327
                C                THETLS  = LAST NON-ZERO ANGLE ALONG THE RAY                CTL2       328
                C                C0      = SOUND SPEED                                      CTL2       329
      370       C                IREG    = REGION INDEX                                     CTL2       330
                C                JSEC    = SECTOR INDEX WITHIN REGION                       CTL2       331
                C                CURV    = CURVATURE OF RAY                                 CTL2       332
                C                RAD     = 1/CURV (IF CURV = 0, RAD = 0)                    CTL2       333
                C                TSLOSS  = SPREADING INTENSITY = QVERT * QHORZ / 9.         CTL2       334
      375       C                QVERT   = VERTICAL SPREADING FACTOR                        CTL2       335
                C                QHORZ   = HORIZONTAL SPREADING FACTOR                      CTL2       336
                C                SLOSS   = LOSS DUE TO SPREADING - 10*LOG(TSLOSS)           CTL2       337
                C                QFAC1,QFAC3 = FACTORS FOR COMPUTING QVERT AND              CTL2       338
                C                        TDERV (ANGLE DERIVATIVE)                           CTL2       339
      380       C                BLOSS   = LOSS DUE TO BOTTOM REFLECTIONS                   CTL2       340
                C           4. FINAL CONTITIONS (AT END OF STEP)                            CTL2       341
                C                X1      = RANGE                                            CTL2       342
                C                Y1      = DEPTH                                            CTL2       343
                C                T1      = ANGLE                                            CTL2       344
      385       C                DT      = TRAVEL-TIME INCREMENT                            CTL2       345
                C                C1      = SOUND SPEED                                      CTL2       346
                C                IQFLAG  = 0 NO CHANGE IN CURV AT LAST EVENT                CTL2       347
                C                        1 BOTTOM OR SURFACE REFLECTION                     CTL2       348
                C                        2 CROSSED SECTOR BOUNDARY                          CTL2       349
      390       C                FLAGS EQUIVALENCED TO IND(6)                               CTL2       350
                C                IARV    = 1   ARRIVAL                                     CTL2       351
                C                IHORZ   = 1   HORIZONTAL                                   CTL2       352
                C                ISURF   = 1   SURFACE REFLECTION                           CTL2       353
                C                IBOT    = 1   REFLECTION AT END-POINT                      CTL2       354
      395       C                        2   REFLECTION PRIOR TO END-POINT                  CTL2       355
                C                IBD     = 1   RAY AT SECTOR BOUNDARY                       CTL2       356
                C                JLINE (ONLY COUNTS IF IBD = 1)                             CTL2       357
                C                      = 0 RAY AT VERTICAL BOUNDARY                         CTL2       358
                C                        .GT. 0 RAY AT JLINE-TH SECTOR BOUNDARY             CTL2       359
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                C                    IHZARV = 1   HORIZONTAL ARRIVAL                          CTL2      360
                C                                                                             CTL2      361
                      TDG  =  THEO(I)                                                         CTL2      362
                      THETA0 = THEO(I)  / 57.29577951                                         CTL2      363
                      SECTH7 = 1.00 / COS (THETA0)                                            CTL2      364
                      XG = BEGINX                                                             CTL2      365
                      YD = BEGINY                                                             CTL2      366
                C                                                                             CTL2      367
                C                                                                             CTL2      368
                C          WRITE INITIAL POINT ON TRAJECTORY TO TRAJECTORY FILE.              CTL2      369
                C                                                                             CTL2      370
                      XONM=XO/6076.1                                                          CTL2      371
                      WRITE(TRAJCT)XONM,YO,THETA0                                             CTL2      372
                C                                                                             CTL2      373
                C                                                                             CTL2      374
                      JP=0                                                                    CTL2      375
                      IF(JPRNT.GE.1)                                                          CTL2      376
                     1  WRITE(6,1002) JP,XONM,YO,TDG                                         FIXFOR      7
                      XNM=XO/6076.1                                                           CTL2      378
                      TIME=0.                                                                 CTL2      379
                      DO 109 II=1,NDEPS                                                       CTL2      380
                    109 NARV(II) = 0                                                          CTL2      381
                      NBH  =  0                                                               CTL2      382
                      NBR  =  0                                                               CTL2      383
                      NSH  =  0                                                               CTL2      384
                      NSR  =  0                                                               CTL2      385
                      IFXH(I) = 0                                                             CTL2      386
                      TLOSS  =  0.                                                            CTL2      387
                      NC  =  0                                                                CTL2      388
                      LASTEV  =  0                                                            CTL2      389
                      K  =  0                                                                 CTL2      390
                      IF(KPRNT.GE.1)                                                          CTL2      391
                     1WRITE(6,107)XNM,YO,TDG,TIME,TLOSS,NBH,NBR,NSH,NSR,NC,(NARV(II),         CTL2      392
                     2       II=1,NDEPS)                                                    CTL2      393
                C                                                                             CTL2      396
                C              SETTING FLAGS AND DETERMINING INITIAL SECTOR FOR RAY.          CTL2      397
                C          IF RAY IS TANGENT TO A SECTOR BOUNDARY, DETERMINE WHICH WAY        CTL2      398
                C          RAY WILL GO. IF AXIAL CUT. IF ALONG MAXIMUM  TAKE UPPER            CTL2      399
                C          SECTOR IF RAY UPGOING, LOWER IF DOWNGOING.                         CTL2      400
                C                                                                             CTL2      401
                      LINFLG(1) = 0                                                           CTL2      402
                      LINFLG(2) = 0                                                           CTL2      403
                      LINFLG(3) = LINFLT                                                      CTL2      404
                C                                                                             9NOV77     31
                C          IF THE RECEIVER DEPTH EQUALS ONE OF THE SOURCE DEPTHS, SET         9NOV77     32
                C          LINFLG(3) TO THE INDEX OF THE SOURCE DEPTH THAT THE RECEIVER       9NOV77     33
                C          DEPTH EQUALS.                                                      9NOV77     34
                C                                                                             9NOV77     35
                      DO 349 LDEPTH = 1,NDEPS                                                 CTL2      405
                      IF (REGINY .EQ. YDEP(LDEPTH)) LINFLG(2) = LDEPTH                        CTL2      406
                    349 CONTINUE                                                              CTL2      407
                      THETLS  =  THETA0                                                       CTL2      408
                      IBEGIN  =  IABS(IBEGNP)                                                 CTL2      409
                C                                                                             CTL2      410
                C                                                                             CTL2      411
                C        GET CORRECT RAYFILE RECORD                                           CTL2      412
                C                                                                             CTL2      413
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                C                                                                       CTL2      414
                      CALL GETQAN(IBEGIN)                                               CTL2      415
                      CALL GETPRO(IBEGIN)                                               CTL2      416
460                   JBEGIN  =  IABS(JBEGNP)                                           CTL2      417
                      TANTHZ = TAN(THETA0)                                              CTL2      418
                      IF((IBEGNP.GT.0).AND.(JBEGNP.GT.0)) GO TO 390                     CTL2      419
                      LINFLG(1) = JBEGIN                                                CTL2      420
                C 350 IF (TANTHZ+AR(IBEGIN,JBEGIN)) 360,380,370                         CTL2      421
465             350   IF (TANTHZ+AR(       JBEGIN)) 360,380,370                       CTL2      422
                  360 IF(IBEGNP.GT.0) GO TO 390                                         CTL2      423
                C     IF (VBORY(IBEGIN,JBEGIN+1) .NE. BEGINY) GO TO 390                 CTL2      424
                      IF (VBORY(       JBEGIN+1) .NE. BEGINY) GO TO 390                 CTL2      425
                      JBEGIN  =  JBEGIN+1                                               CTL2      426
470                   LINFLG(1) = JBEGIN                                                CTL2      427
                      GO TO 350                                                         CTL2      428
                  370 JBEGIN  =  JBEGIN-1                                               CTL2      429
                      GO TO 390                                                         CTL2      430
                  380 IF(JBEGIN.EQ.1) GO TO 390                                         CTL2      431
475             C     GUP=AC(IBEGIN,JBEGIN-1)*SINTHZ+BC(IBEGIN,JBEGIN-1)*COSTHZ         CTL2      432
                      GUP=AC(       JBEGIN-1)*SINTHZ+BC(       JBEGIN-1)*COSTHZ         CTL2      433
                C     GDN=AC(IBEGIN,JBEGIN  )*SINTHZ+BC(IBEGIN,JBEGIN  )*COSTHZ         CTL2      434
                      GDN=AC(       JBEGIN  )*SINTHZ+BC(       JBEGIN  )*COSTHZ         CTL2      435
                      SUP  =  SIGN(1.,GUP)                                              CTL2      436
480                   SDN  =  SIGN(1.,GDN)                                              CTL2      437
                      IF(SUP-SDN)386,382,384                                            CTL2      438
                  382 IF (SUP) 390,390,370                                              CTL2      439
                  384 IF (SINTHZ) 390,370,370                                           CTL2      440
                  386 WRITE(6,387)                                                      CTL2      441
485               387 FORMAT (1H0,//////,23H AXIAL RAY - NOT TRACED)                    CTL2      442
                       GO TO 840                                                        9NOV77     36
                  390 IF(THETA0)393,391,395                                             CTL2      444
                C 391 IF (BC(IBEGIN,JBEGIN)) 394,392,396                                CTL2      445
                391   IF (BC(       JBEGIN)) 394,392,396                                CTL2      446
498               392 THERST  =  0.                                                     CTL2      447
                      GO TO 399                                                         CTL2      448
                C                                                                       CTL2      449
                C         INSERT EXTRA HORIZONTALS                                      CTL2      450
                C                  1. IF DOWN-GOING RAY IN NEGATIVE GRADIENT ADD SH     CTL2      451
495             C                  TO BE CONSISTENT THROUGH ZERO DEGREES                CTL2      452
                C                  2. IF UPGOING IN POSITVE GRADIENT ADD BH             CTL2      453
                C                                                                       CTL2      454
                C 393 IF (BC(IBEGIN,JBEGIN) .GT. 0.0) GO TO 398                         CTL2      455
                393   IF (BC(       JBEGIN) .GT. 0.0) GO TO 398                         CTL2      456
500               394 K  =  1                                                           CTL2      457
                      NSH  =  1                                                         CTL2      458
                      CALL JPUTB (ISEQ(1),6*K-5,6,8)                                    CTL2      459
                      GO TO 398                                                         CTL2      460
                C 395 IF (BC(IBEGIN,JBEGIN) .LT. 0.0) GO TO 398                         CTL2      461
505             395   IF (BC(       JBEGIN) .LT. 0.0) GO TO 398                         CTL2      462
                  396 K  =  1                                                           CTL2      463
                      LASTEV  =  1                                                      CTL2      464
                      NBH  =  1                                                         CTL2      465
                C                                                                       CTL2      466
510             C         SET UP OF SEQUENTIAL SIGNATURE                                CTL2      467
                C             THE SEQUENTIAL SIGNATURE STORES EVENTS SEQUENTIALLY       CTL2      468
                C         FROM RIGHT TO LEFT WITHIN A WORD, THE WORDS THEMSELVES GOING  CTL2      469
                C         FROM LEFT TO RIGHT STARTING AT ISEQ(1,I), IN THE IAM          CTL2      470
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      C         EIGHT BITS PER EVENT (FOUR EVENTS PER WORD) AND ALLOCATED.      CTL2   471
515   C         THE VARIABLE IR IS TYPICALLY USED FOR THE EVENT AS FOLLOWS      CTL2   472
      C                                                                         CTL2   473
      C         IR      =  0 SURFACE HORIZONTAL                                 CTL2   474
      C                    1 SURFACE REFLECTION                                 CTL2   475
      C                    2 BOTTOM HORIZONTAL                                  CTL2   476
520   C                    2+IFACET BOTTOM REFLECTION OFF FACET NO. IFACET      CTL2   477
      C                                                                         CTL2   478
      C         NOTE - THIS LIMITS THE NUMBER OF BOTTOM FACETS TO 125 (2**-3)   CTL2   479
      C                                                                         CTL2   480
      C              THE NUMBER OF EVENTS AT AN ARRIVAL IS FOUND BY             CTL2   481
525   C         DECOMPOSING ISIG, WHERE                                         CTL2   482
      C                                                                         CTL2   483
      C         ISIG = NSR*I01 + NSH*I02 + NBR*I03 + NBH*I04                    CTL2   484
      C                                                                         CTL2   485
      C         AND IOK = (2**8)**(K-1)                                         CTL2   486
530   C                                                                         CTL2   487
      C         HENCE ALLOWING EIGHT BITS PER EVENT IN ISIG LIMITS THE          CTL2   488
      C         MAXIMUM NUMBER OF ANY ONE EVENT TO 127                          CTL2   489
      C                                                                         CTL2   490
            CALL JPUTB (ISEQ(1),6*K-5,6,2)                                      CTL2   491
535       398 THFRST  =  1.                                                     CTL2   492
            IFXH(I) = 1                                                         CTL2   493
          399 CONTINUE                                                          CTL2   494
            IREG  =  IBEGIN                                                     CTL2   495
            CALL GETPRO(IREG)                                                   CTL2   496
540         CALL GETQAN(IREG)                                                   CTL2   497
            JSEC  =  JBEGIN                                                     CTL2   498
            NIND = 6                                                            CTL2   499
            C0 = VELOC(IBEGIN,JBEGIN,X0,Y0)                                     CTL2   500
            TDERV  =  1.                                                        CTL2   501
545         QVERT  =  0.                                                        CTL2   502
            QHORZ  =  0.                                                        CTL2   503
            IQFLAG  =  0                                                        CTL2   504
             BLOSS        =    0.                                              CTL2   505
            QFAC1  =  0.                                                        CTL2   506
550         QFAC3  =  0.                                                        CTL2   507
            NQ  =  6.                                                           CTL2   508
            QSIGN  =  1.                                                        CTL2   509
      C                                                                         CTL2   510
      C         1.2.3 INITIALIZATION FOR EACH STEP                            CTL2   511
555   C                                                                         CTL2   512
      C         ALL STEPS BEGIN AT 400                                        CTL2   513
      C                                                                         CTL2   514
          400 DO 401 IND=1,NIND                                                 CTL2   515
          401 INDIC(IND) = 0                                                    CTL2   516
560         IF(THFRST.NE.0.) GO TO 406                                          CTL2   517
            IF(K.NE.0) GO TO 404                                                CTL2   518
      C     IF (BC(IREG,JSEC)) 402,406,403                                      CTL2   519
            IF (BC(     JSEC)) 402,406,403                                      CTL2   520
          402 K  =  1                                                           CTL2   521
565         NSH  =  1                                                           CTL2   522
            CALL JPUTB (ISEQ(1),6*K-5,6,0)                                      CTL2   523
            GO TO 404                                                           CTL2   524
          403 K  =  1                                                           CTL2   525
            LASTEV  =  1                                                        CTL2   526
570         NBH  =  1                                                           CTL2   527
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                      CALL JPUTA (ISEQ(1),6*K-5,6,2)                                    CTL2     528
                  404 THERST  =  1.                                                     CTL2     529
                      IFKH(I) = 1                                                       CTL2     530
                  406 CONTINUE                                                          CTL2     531
  575                 IHZARV = 0                                                        CTL2     532
                      NROOTS = 0                                                        CTL2     533
                      NBDRY = 3                                                         CTL2     534
                      IFLAG1 = 0                                                        CTL2     535
                      SINTHZ  =  SIN(THETA0)                                            CTL2     536
  580                 SINT72 = 2. * (SIN(THETA0 / 2.))**2                               CTL2     537
                      COSTHZ  =  COS(THETA0)                                            CTL2     538
                C                                                                       CTL2     539
                C         NBDRY  =  2 IF VERTICAL BOUNDARY OF A TRIANGULAR SECTOR       CTL2     540
                C            IS AT MINIMUM IN RANGE                                     CTL2     541
  585           C            3 IF WE ARE IN A HORIZONTAL SECTOR OR A TRIANGULAR         CTL2     542
                C            SECTOR WITH THE VERTICAL BOUNDARY AT MAXIMUM IN RANGE.     CTL2     543
                C                                                                       CTL2     545
                C     IF ( (RTYPE(IREG) .EQ. 1) .OR. (JSEC .GT. (NSECS(IREG)-NHORZ(IREG) CTL2     546
                C    1)) .OR. (YBDRY(IREG,JSEC) .EQ. YBDRY(IREG,JSEC+1) ) ) GO TO 405   CTL2     547
  590                 IF (                          (JSEC .GT. (NUMSEC-NHORZ) )         CTL2     548
                     1   .OR. (YBDRY(JSEC) .EQ.YBDRY(JSEC+1) ) ) GO TO 405              CTL2     549
                      NBDRY = 2                                                         CTL2     550
                  405 CURV = 0.                                                         CTL2     551
                C     PHI0=THETA0-ALPHR(IREG,JSEC)                                      CTL2     552
  595                 PHI0=THETA0-ALPHR(     JSEC)                                      CTL2     553
                      COSP0 = COS(PHI0)                                                 CTL2     554
                      SINP0 = SIN(PHI0)                                                 CTL2     555
                C     CURV=SIGN((GRAD(IREG,JSEC)*COSP0/C0),SINTHZ*AC(IREG,JSEC)+        CTL2     556
                C    1          COSTHZ*BC(IREG,JSEC)))                                 CTL2     557
  600                 CURV=SIGN((GRAD(     JSEC)*COSP0/C0),(SINTHZ*AC(     JSEC)+    CTL2     558
                     1          COSTHZ*BC(     JSEC)))                                 CTL2     559
                      IF(ABS(CURV).LE.(1.0E-9)) CURV = 0.                               CTL2     560
                C     SINAL=SIN(ALPHR(IREG,JSEC))                                       CTL2     561
                      SINAL=SIN(ALPHR(     JSEC))                                       CTL2     562
  605           C     COSAL=COS(ALPHR(IREG,JSEC))                                       CTL2     563
                      COSAL=COS(ALPHR(     JSEC))                                       CTL2     564
                      IF(IQFLAG.EQ.0) GO TO 409                                         CTL2     565
                      TDERV  =  TDERV + QFAC3*(QFAC1+CURV)                              CTL2     566
                  409 CONTINUE                                                          CTL2     567
  610                 IF(JPRNT.GE.1)                                                    CTL2     568
                     1 WRITE(6,4090)IQFLAG,TDERV,QVERT,QHORZ,NBDRY,QFAC1,QFAC3,CURV,DQ  01MAR79    5
                 4090  FORMAT(44X,*IQFLAG=*,I1,*   TDERV=*,E10.3,*   QVERT=*,E10.3,*   Q FIXFOR    8
                     1HORZ=*,E10.3,/,                                                   01MAR79    6
                     2              44X, *NBDRY =*,I1,3X,                              01MAR79    7
  615                2              *QFAC1=*,E10.3,*   QFAC3=*,E10.3,*   CURV =*,E10.3, FIXFOR   10
                     4              *   DQ=*,E10.3)                                    FIXFOR   11
                      IF (CURV.EQ.0.) GO TO 410                                         CTL2     571
                      RAD = 1./CURV                                                     CTL2     572
                      GO TO 411                                                         CTL2     573
  620               410 AL = -SINTHZ / COSTHZ                                         CTL2     574
                      BL = Y0 - AL * X0                                                 CTL2     575
                      RAD = 0.                                                          CTL2     576
                C                                                                       CTL2     577
                C         1.2.4 COMPUTE INTERSECTIONS WITH SECTOR BOUNDARIES           CTL2     578
  625           C                                                                       CTL2     579
                C         LOOP ON NUMBER OF ELIGIBLE BOUNDARIES (2 OR 3)              CTL2     580
                C                                                                       CTL2     581
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                411 DO 450 NBD = 1,NBDRY                                          CTL2     582
                    IF(NBD .EQ. 3) GO TO 420                                      CTL2     583
630             C                                                                 CTL2     584
                C       CHECKING SECTOR BOUNDARIES                                CTL2     585
                C                                                                 CTL2     586
                    JJ = JSEC + NBD - 1                                           CTL2     587
                C   A=AB(IREG,JJ)                                                 CTL2     588
635                 A=AB(     JJ)                                                 CTL2     589
                C   B=BB(IREG,JJ)                                                 CTL2     590
                    B=BB(     JJ)                                                 CTL2     591
                    GO TO 430                                                     CTL2     592
                C                                                                 CTL2     593
640             C       CHECKING VERTICAL BOUNDARY                                CTL2     594
                C                                                                 CTL2     595
                C 420 IF ( (NROOTS .GT. 0) .AND. (X1 .LT. XBDRY(IREG+1)) ) GO TO 450  CTL2     596
                C                                                                 CTL2     597
                C       READ RANGE FROM PROFILE RECORD IREG+1.                    CTL2     598
645             C                                                                 CTL2     599
                C                                                                 CTL2     600
                420   READ(PROFILE)XBDRY2                                         CTL2     601
                    BACKSPACE PROFILE                                             CTL2     602
                    IF ( (NROOTS .GT. 0) .AND. (X1 .LT. XBDRY2       ) ) GO TO 450  CTL2     603
650                 IFLAG1 = 1                                                    CTL2     604
                    A = 0.                                                        CTL2     605
                C   B=XBDRY(IREG+1)                                               CTL2     606
                    B=XBDRY2                                                      CTL2     607
                  430 IF(CURV.EQ.0.) GO TO 435                                    CTL2     608
655                 IFLAG2 = 0                                                    CTL2     609
                    IF ((JJ .EQ. LINFLG(1)) .AND. (NBD .NE. 3)) IFLAG2 = 1        CTL2     610
                C                                                                 CTL2     611
                C       LINCIR COMPUTES INTERSECTIONS OF THE CIRCULAR RAY WITH     CTL2     612
                C       STRAIGHT LINES                                            CTL2     613
660             C       IFLAG1 =  0 FOR NON-VERTICAL LINES                        CTL2     614
                C                 1 FOR VERTICAL LINES                            CTL2     615
                C       WHEN CALLING                                              CTL2     616
                C       IFLAG2 =  0 X0,Y0 NOT ON LINE                             CTL2     617
                C                 1 X0,Y0 ON LINE                                 CTL2     618
665             C       WHEN RETURNING                                            CTL2     619
                C       IFLAG2 =  0 NO VALID INTERSECTIONS PAST X0,Y0              CTL2     620
                C                 1 INTERSECTION AT XT,YT                         CTL2     621
                C       OTHER VARIABLES                                           CTL2     622
                C       A      =  LINE SLOPE                                      CTL2     623
670             C       B      =  LINE INTERCEPT AT X = 0                         CTL2     624
                C       TT     =  RAY ANGLE AT XT, YT                             CTL2     625
                C       DXR    =  (XT - X0) / RAD                                 CTL2     626
                C       DYR    =  (YT - Y0) / RAD                                 CTL2     627
                C                                                                 CTL2     628
675                   XTN=X0/6076.1                                               01MAR79    8
                      IF( KPRNT .GT. 1) WRITE(6,431) IFLAG1,IFLAG2,XTN,Y0         01MAR79    9
                 431  FORMAT(15X,*AT FORMAT 431, IFLAG1=*,I1,*  IFLAG2=*,I1,*  XTN=*,  01MAR79   10
                     1          F10.4,*  Y0=*,F10.4)                              01MAR79   11
                    CALL LINCIR(IFLAG1,A,B,X0,Y0,THETA0,RAD,IFLAG2,XT,YT,TT,DXR,DYR)  CTL2     629
680             C                                                                 9NOV77   37
                C       IF LINCIR DID NOT FIND AN INTERSECTION, TT WILL NOT HAVE BEEN 9NOV77   38
                C       SET.                                                      9NOV77   39
                C                                                                 9NOV77   40
                      IF( IFLAG2 .EQ. 0) TT=THETA0                                9NOV77   41
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                      IF( IFLAG2 .EQ. 0) XT=X0                                  9NOV77    42
                      XTN=XT/6076.1                                             FIXFOR    12
                      TTN=TT*57.29577951                                        FIXFOR    13
                C ***********************************************************   FIXFOR    14
                C                                                               FIXFOR    15
                C                   JP=1 FOR DEBUG.                             FIXFOR    16
                C                                                               FIXFOR    17
                C ***********************************************************   FIXFOR    18
                      JP = 1                                                    CTL2      630
                      IF(JPRNT.EQ.2)                                            CTL2      631
                     1  WRITE(6,1000) JP,XTN,YT,TTN,IFLAG2                      FIXFOR    19
                      IF(IFLAG2.EQ.0) GO TO 450                                 CTL2      634
                      IF((NROOTS.NE.0) .AND. (XT.GT.X1)) GO TO 450              CTL2      635
                C                                                               CTL2      636
                C           NEW INTERCEPT CLOSER TO X0 FOUND STORE APPROPRIATE   CTL2      637
                C         VALUES AND COMPUTE TIME INCRIMENT FROM TSUBC (FOR CIRCLES) CTL2   638
                C         TSUBS (FOR LINES)                                     CTL2      639
                C                                                               CTL2      640
                  432 NROOTS = 1                                                CTL2      641
                      C1  =  VELOC(IREG,JSEC,XT,YT)                             CTL2      642
                      JLINE =NBD                                                CTL2      643
                      X1 = XT                                                   CTL2      644
                      Y1 = YT                                                   CTL2      645
                      T1 = TT                                                   CTL2      646
                      DXRSAV  =  DXR                                            CTL2      647
                      DYRSAV  =  DYR                                            CTL2      648
                      IF(CURV.NE.0.)DT=TSUBC(IREG,JSEC,DXR,DYR)                 CTL2      649
                      IF(CURV.EQ.0.)DT=TSUBL(IREG,JSEC)                         CTL2      650
                      GO TO 450                                                 CTL2      651
                C                                                               CTL2      652
                C           LINLIN COMPUTES INTERSECTION OF STRAIGHT RAY WITH   CTL2      653
                C         BOUNDARY. IFLAG2 = 0 FOR NO VALID ROOTS.              CTL2      654
                C                                                               CTL2      655
                  435 CONTINUE                                                  CTL2      656
                      IF ((JJ .EQ. LINFLG(1)) .AND. (NBD .NE. 3)) GO TO 450     CTL2      657
                      CALL LINLIN (0, AL, BL, IFLAG1, A, B, IFLAG2, XT, YT)     CTL2      658
                      TT = THETA0                                               CTL2      659
                       XTN=XT/6076.1                                            FIXFOR    20
                       TTN=TT*57.29577951                                       FIXFOR    21
                C ***********************************************************   FIXFOR    22
                C                                                               FIXFOR    23
                C                   JP=2 FOR DEBUG.                             FIXFOR    24
                C                                                               FIXFOR    25
                C ***********************************************************   FIXFOR    26
                      JP = 2                                                    CTL2      660
                      IF(JPRNT.EQ.2)                                            CTL2      661
                     1  WRITE(6,1000)JP,XTN,YT,TTN,IFLAG2                       FIXFOR    27
                      IF(IFLAG2.EQ.0)GO TO 450                                  CTL2      663
                      IF (XT .LT. X0) GO TO 450                                 CTL2      664
                      IF ((NROOTS .EQ. 0) .OR. (XT .LE. X1)) GO TO 432          CTL2      665
                  450 CONTINUE                                                  CTL2      666
                C                                                               CTL2      667
                C         1.2.5 STORING PARAMETERS FOR VALID INTERSECTION WITH  CTL2      668
                C         SECTOR BOUNDARY                                       CTL2      669
                C                                                               CTL2      670
                      IF(NROOTS.EQ.0) GO TO 460                                 CTL2      671
                      DXR  =  DXRSAV                                            CTL2      672
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                      DYR  =  DYRSAV                                                  CTL2     673
                      IBD = 1                                                        CTL2     674
                      IF(JLINE.EQ.3) JLINE = 0                                       CTL2     675
745                   IF(JLINE .NE. 0) JLINE = JSEC + JLINE - 1                      CTL2     676
                      IF((T1.EQ.0.).AND.(THETA0.NE.0.)) GO TO 470                    CTL2     677
                      GO TO 480                                                      CTL2     678
                C                                                                    CTL2     679
                C         1.2.6 RAY HAS HORIZONTAL INSIDE SECTOR                     CTL2     680
750             C                                                                    CTL2     681
                  460 X1    = X0 - RAD*SINTHZ                                      CTL2     682
                      Y1    = Y0 + RAD*SINTZ2                                      CTL2     683
                      T1    = 0.                                                   CTL2     684
                      IF(X1 .LT. X0) GO TO 800                                       CTL2     685
755                   DXR  =  -SINTHZ                                                CTL2     686
                      DYR= SINTZ2                                                    CTL2     687
                      C1   =  VELOC(IREG,JSEC,X1,Y1)                                 CTL2     688
                      DT   =  TSUBC(IREG,JSEC,DXR,DYR)                               CTL2     689
                  470 IHORZ = 1                                                      CTL2     690
760                    XTN=X1/6076.1                                                 FIXFOR    28
                       TTN=T1*57.29577951                                            FIXFOR    29
                C ***************************************************************  FIXFOR    30
                C                                                                    FIXFOR    31
                C                       JP=3 FOR DEBUG.                              FIXFOR    32
765             C                                                                    FIXFOR    33
                C ***************************************************************  FIXFOR    34
                      JP = 3                                                         CTL2     691
                      IF(JPRNT.EQ.2)                                                 CTL2     692
                     1  WRITE(6,1005)JP,XTN,Y1,TTN,IREG,JSEC,(INDIC(II),II=1,6)     FIXFOR    35
770             C                                                                    CTL2     695
                C         1.2.7 CHECK FOR BOTTOM REFLECTION                          CTL2     696
                C         ROUTINE MPHITB COMPUTES INTERSECTION WITH BOTTOM            CTL2     697
                C             CALLING IBOT = BOTTOM FACET OF RAY IF LAST POINT ON    CTL2     698
                C                          BOTTOM.                                   01MAR79   12
775             C             RETURNING IBOT =                                       01MAR79   13
                C                   0 NO REFLECTION                                  CTL2     700
                C                   1 REFLECTION BEFORE XT,YT                        CTL2     701
                C                   2 REFLECTION AT XT,YT                            CTL2     702
                C             IFACET = REFLECTION FACET                              CTL2     703
780             C             THE POSITION VARIABLES ARE SENT AND RETURNED IN /BOTREF/ CTL2     704
                C             INCLUDING THE GRAZING ANGLE PSI AND THE TIME INCREMENT DT CTL2     705
                C                                                                    CTL2     706
                  480 CONTINUE                                                       CTL2     707
                      IBOT = LINFLG(3)                                               CTL2     708
785                    XTN0=X0/6076.1                                                01MAR79   14
                       XTN1=X1/6076.1                                                01MAR79   15
                       IF( KPRNT .GT. 1) WRITE(6,485)IREG,JSEC,IBOT,XTN0,Y0,XTN1,Y1, 01MAR79   16
                     1           DXR,DYR                                           01MAR79   17
                   485   FORMAT(15X,*AT FORMAT 485,IREG,JSEC,IBOT,XTN0,Y0,XTN1,Y1,DXR,DYR= 01MAR79   18
790                 1=*, 3I3,4F9.3,2E11.4)                                         01MAR79   19
                       CALL MPHITB (IREG, JSEC, IBOT, IFACET, DXR, DYR)              CTL2     709
                       IF(IBOT.EQ.0) GO TO 490                                       CTL2     710
                C ***************************************************************  30OCT74   21
                C                                                                    30OCT74   22
795             C                                                                    30OCT74   23
                C          FOR DEBUG, JP=8  (BOTTOM BOUNCE TEST.)                    30OCT74   24
                C                                                                    30OCT74   25
                C                                                                    30OCT74   26
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      C ***************************************************************  30OCT74    27
            JP=8                                                        30OCT74    28
             XTN=X1/6076.1                                              FIXFOR     36
             TTN=T1*57.29577951                                         FIXFOR     37
             IF( JPRNT .GT. 0)                                          FIXFOR     38
           1  WRITE(6,1010)                                             FIXFOR     39
       1010  FORMAT(9X,*--- BOTTOM BOUNCE NEXT ---*)                    FIXFOR     40
             IF( JPRNT .GT. 0)                                          FIXFOR     41
           1         WRITE(6,1004) JP,XTN,Y1,TTN,IBOT,IFACET            01MAR79    20
            IF(IBOT.EQ.1) IBD = 0                                       CTL2      711
            IF(IBOT.EQ.2) IBOT = 1                                      CTL2      712
            IHORZ = 0                                                   CTL2      713
            GO TO 500                                                   CTL2      714
        490 IF(IHORZ.EQ.1 .OR. JLINE.NE.1) GO TO 500                    CTL2      715
            ISURF = 1                                                   CTL2      716
            Y1 = 0.                                                     CTL2      717
        500 CONTINUE                                                    CTL2      718
      C                                                                 CTL2      719
      C          1.2.8 ARRIVAL TEST                                     CTL2      720
      C                501  LOOP FOR RAYS DOWNGOING                     CTL2      721
      C                505  LOOP FOR RAYS UPGOING                       CTL2      722
      C                550  IF NO ARRIVAL POSSIBLE                      CTL2      723
      C                540  FOR ARRIVAL PRECISELY AT Y1                 CTL2      724
      C                509  FOR ARRIVAL BETWEEN Y3 AND Y1               CTL2      725
      C                                                                 CTL2      726
             IF( KPRNT .GT. 1) WRITE(6,499) Y0,Y1,LINFLG(2)             01MAR79    21
       499   FORMAT(15X,*AT FORMAT 499, Y0=*,F10.4,*  Y1=*,F10.4,*  LINFLG(2)= 01MAR79    22
           1*          ,I3)                                             01MAR79    23
            IF(Y0 - Y1)     501,550,505                                 CTL2      727
        501 DO 502 LDEPTH=1,NDEPS                                       CTL2      728
            IF (LDEPTH .EQ. LINFLG(2)) GO TO 502                        CTL2      729
            IF(Y0.LT. YDEP(LDEPTH)) GO TO 503                           CTL2      730
        502 CONTINUE                                                    CTL2      731
            LDEPTH = NDEPS                                              CTL2      732
            GO TO 550                                                   CTL2      733
        503 IF(YDEP(LDEPTH) - Y1)     509,540,550                       CTL2      734
        505 DO 506 KD = 1,NDEPS                                         CTL2      735
            LDEPTH = NDEPS +1 - KD                                      CTL2      736
            IF (LDEPTH .EQ. LINFLG(2)) GO TO 506                        CTL2      737
            IF(Y0.GT. YDEP(LDEPTH)) GO TO 507                           CTL2      738
        506 CONTINUE                                                    CTL2      739
            GO TO 550                                                   CTL2      740
        507 IF(YDEP(LDEPTH) - Y1)     550,540,509                       CTL2      741
        509 IHORZ = 0                                                   CTL2      742
            IBOT  = 0                                                   CTL2      743
            ISURF = 0                                                   CTL2      744
            IBD   = 0                                                   CTL2      745
            IF(CURV.EQ.0.0) GO TO 510                                   CTL2      746
            IFLAG2 = 0                                                  CTL2      747
            CALL LINCIR(0.0.,YDEP(LDEPTH),X0,Y0,THETA0,RAD,IFLAG2,X1,Y1,T1,  CTL2      748
           1   DXR,DYR)                                                 CTL2      749
             XTN=X1/6076.1                                              FIXFOR     43
             TTN=T1*57.29577591                                         FIXFOR     44
      C ***************************************************************  FIXFOR     45
      C                                                                 FIXFOR     46
      C                         JP=4 FOR DEBUG.                         FIXFOR     47
      C                                                                 FIXFOR     48
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                C ***************************************************************      FIXFOR     49
                      JP = 4                                                           CTL2      750
                      IF(JPRNT.EQ.2)                                                   CTL2      751
                     1  WRITE(6,1000) JP,XTN,Y1,TTN,IFLAG2                            FIXFOR     50
A60                   C1  =  VELOC(IREG,JSEC,X1,Y1)                                   CTL2      753
                      DT  =  TSUBC(IREG,JSEC,DXR,DYR)                                 CTL2      754
                      GO TO 540                                                       CTL2      755
                  510 CALL LINLIN(0.,AL,BL,0.0.,YDEP(LDEPTH),IFLAG2,X1,Y1)            CTL2      756
                       XTN=X1/6076.1                                                  FIXFOR     51
A65                    TTN=T1*57.29577951                                            FIXFOR     52
                C ***************************************************************      FIXFOR     53
                C                                                                      FIXFOR     54
                C                          JP=5 FOR DEBUG.                             FIXFOR     55
                C                                                                      FIXFOR     56
A70             C ***************************************************************      FIXFOR     57
                      JP = 5                                                           CTL2      757
                      IF(JPRNT.EQ.2)                                                   CTL2      758
                     1  WRITE(6,1000)JP,XTN,Y1,TTN,IFLAG2                             FIXFOR     58
                      C1  =  VELOC(IREG,JSEC,X1,Y1)                                   CTL2      760
A75                   DT  =  TSUBL(IREG,JSEC)                                         CTL2      761
                  540 IARV = 1                                                        CTL2      762
                      Y1 = YDEP(LDEPTH)                                               CTL2      763
                       XTN=X1/6076.1                                                  FIXFOR     59
                       TTN=T1*57.29577951                                             FIXFOR     60
A80             C ***************************************************************      FIXFOR     61
                C                                                                      FIXFOR     62
                C                      JP=6 FOR DEBUG.                                 FIXFOR     63
                C                                                                      FIXFOR     64
                C ***************************************************************      FIXFOR     65
A85               550 JP = 6                                                         CTL2      764
                      IF(JPRNT.EQ.2)                                                   CTL2      765
                     1  WRITE(6,1005) JP,XTN,Y1,TTN,IREG,JSEC,(INDIC(II),II=1,6)      FIXFOR     66
                C                                                                      CTL2      767
                C         1.2.9 VALID POINT ON TRACE HAS BEEN FOUND                    CTL2      768
A90             C                                                                      CTL2      769
                      XNM  =  X1/6076.1                                                CTL2      770
                      TDG  =  T1*57.29577951                                           CTL2      771
                      TIME = TIME + DT                                                 CTL2      772
                C                                                                      CTL2      773
A95             C                                                                      CTL2      774
                C                                                                      CTL2      775
                C          WRITE TRAJECTORY TO DISK TRAJCT FOR LATER POSSIBLE PLOTTING. CTL2      776
                C                                                                      CTL2      777
                C                                                                      CTL2      778
900                   WRITE(TRAJCT) XNM,Y1,T1                                          CTL2      779
                C                                                                      CTL2      780
                C                                                                      CTL2      781
                C         1.2.10 COMPUTE SPREADING FACTORS AT THIS POINT                CTL2      782
                C                                                                      CTL2      783
905             C         DQ     =  INCREMENT TO SPREADING BETWEEN Q0 AND Q1            CTL2      784
                C         QSIGN  =  SIGN OF QVERT                                      CTL2      785
                C                                                                      CTL2      786
                C         IF QVERT CHANGES SIGN CAUSTIC HAS OCCURRED.                  CTL2      787
                C         OTHERWISE GO TO 559                                          CTL2      788
910             C                                                                      CTL2      789
                      IF(CURV.EQ.0.) GO TO 555                                         CTL2      790
                      DXSI = RAD * (DXR * COSAL - DYR * SINAL)                         CTL2      791
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                      DQ   = ABS (DXSI / COSP0)                                  CTL2     792
                      GO TO 560                                                  CTL2     793
      915       555   DQ = ABS1.5*(C1+C0)/C0*(X1-X0)/COSTH7)                     CTL2     794
                560 CONTINUE                                                     CTL2     795
                      QVERTP = QVERT                                             CTL2     796
                      QVERT = QVERT + TDERV * DQ                                 CTL2     797
                      IF((QSIGN*QVERT).GT.0.) GO TO 559                          CTL2     798
      920       C                                                                CTL2     799
                C          1.2.11 CAUSTIC PROCESSING                             CTL2     800
                C                                                                CTL2     801
                C                    CAUSTIC WILL BE LOCATED IF KPRNT .GR. 0     CTL2     802
                C                                                                CTL2     803
      925             QSIGN  =  -QSIGN                                           CTL2     804
                      NC  =  NC + 1                                              CTL2     805
                      IF (QVERT .EQ. 0.00 .OR. KPRNT .EQ. 0) GO TO 559           CTL2     806
                      IF (CURV .EQ. 0.00) GO TO 556                              CTL2     807
                C *************************************************************  FIXFOR    67
      930       C                                                                CTL2     808
                C          LOCATING CAUSTIC FOR CURVED RAYS                      CTL2     809
                C                                                                CTL2     810
                C *************************************************************  FIXFOR    68
                       WRITE(6,1020)                                             FIXFOR    69
      935        1020  FORMAT(9X,*CAUSTIC LOCATION OF CURVED RAY IS NEXT-*)      FIXFOR    70
                      DXIC = ABS (QVERTP * COSP0 / TDERV)                        CTL2     811
                C                                                                CTL2     812
                      IF (DXSI .LT. 0.00) DXIC = -DXIC                           CTL2     813
                      DSPC = ABS (DXIC / RAD)                                    CTL2     814
      940             SPC1 = SINP0 + DSPC                                        CTL2     815
                      SPC2 = SINP0 - DSPC                                        CTL2     816
                C     PHITMP=T1-ALPHR(IREG,JSEC)                                 CTL2     817
                      PHITMP=T1-ALPHR1     JSEC)                                 CTL2     818
                      SPTP = SIGN (PHITMP, 0.00)                                 CTL2     819
      945             SPC = SPC1                                                 CTL2     820
                C                                                                CTL2     821
                      IF ((SPC2.GT.AMIN1(SPTP,SINP0)).AND.(SPC2.LT.AMAX1(SPTP,SINP0)))  CTL2  822
                     1   SPC = SPC2                                              CTL2     823
                C                                                                CTL2     824
      950             PHIC = ASIN (SPC)                                          CTL2     825
                      IF ((PHIC.GE.AMIN1(PHI0,PHITMP)).AND.(PHIC.LE.AMAX1(PHI0,PHITMP)))  CTL2  826
                     1   GO TO 552                                               CTL2     827
                      IF (PHIC .LT. 0.00) GO TO 551                              CTL2     828
                C                                                                CTL2     829
      955             PHIC = 3.14159625 - PHIC                                   CTL2     830
                      GO TO 552                                                  CTL2     831
                C                                                                CTL2     832
                  551 PHIC = -3.14159625 - PHIC                                  CTL2     833
                C                                                                CTL2     834
      960         552 CCAST = ABS (COS (PHIC) * C0 / COSP0)                      CTL2     835
                C     DETAC=(CCAST-C0)/GRAD(IREG,JSEC)                           CTL2     836
                      DETAC=(CCAST-C0)/GRAD(     JSEC)                           CTL2     837
                      DXC   = DXIC * COSAL - DETAC * SINAL                       CTL2     838
                      DYC   = DETAC * COSAL + DXIC * SINAL                       CTL2     839
      965             X1C = X0 + DXC                                             CTL2     840
                      XNMC = X1C / 6076.10                                       CTL2     841
                      YCAS = Y0 + DYC                                            CTL2     842
                C                                                                CTL2     843
                      DXC = DXC / RAD                                            CTL2     844
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          DYC = DYC / RAD                                                 CTL2      845
      C                                                                   CTL2      846
          THCAS = ATAN((DXC*SIN(THETAO))/(DYC*COS(THETAO)))*57.29577951   CTL2      847
      C                                                                   CTL2      848
          SPCC = SINP1                                                    CTL2      849
          CTC = C1                                                        CTL2      850
          C1 = VELOC (IREG, JSEC, X1C, YCAS)                              CTL2      851
          SINP1 = SPC                                                     CTL2      852
          THCAS = TIME - DT + TSUBC (IREG,JSEC,DXC,DYC)                   CTL2      853
      C                                                                   CTL2      854
          SINP1 = SPCC                                                    CTL2      855
          C1 = CTC                                                        CTL2      856
          GO TO 558                                                       CTL2      857
      C ****************************************************************  FIXFOR     71
      C                                                                   CTL2      858
      C        LOCATING CAUSTIC FOR STRAIGHT RAYS                         CTL2      859
      C                                                                   CTL2      860
      C ****************************************************************  FIXFOR     72
       556  CONTINUE                                                      9NOV77     43
            WRITE(6,1050)                                                 FIXFOR     73
       1050 FORMAT(9X,"CAUSTIC LOCATION OF STRAIGHT RAY IS NEXT-")        FIXFOR     74
          DQQ = QVERTP / (QVERT - QVERTP)                                 CTL2      862
          XTC = X1                                                        CTL2      863
          YTC = Y1                                                        CTL2      864
          CTC = C1                                                        CTL2      865
      C                                                                   CTL2      866
          X1 = X0 - (X1 - X0) * DQQ                                       CTL2      867
          Y1 = Y0 - (Y1 - Y0) * DQQ                                       CTL2      868
          C1 = VELOC (IREG,JSEC,X1,Y1)                                    CTL2      869
          THCAS = TIME - DT + TSUBL (IREG,JSEC)                           CTL2      870
          XNMC = X1 / 6076.10                                             CTL2      871
      C                                                                   CTL2      872
          YCAS = Y1                                                       CTL2      873
          X1   = XTC                                                      CTL2      874
          Y1   = YTC                                                      CTL2      875
          C1   = CTC                                                      CTL2      876
          THCAS = TDG                                                     CTL2      877
      C                                                                   CTL2      878
        558 CONTINUE                                                      CTL2      879
          TLOSC = 0.00 + BLOSS                                            CTL2      880
      C ****************************************************************  FIXFOR     75
      C                                                                   FIXFOR     76
      C                      PRINT CAUSTIC LOCATION.                      FIXFOR     77
      C                                                                   FIXFOR     78
      C ****************************************************************  FIXFOR     79
            WRITE (6,107) XNMC,YCAS,THCAS,THCAS,TLOSC,NBH,NBR,NSH,NSR,NC, CTL2      881
          1  (NARV(II),II = 1,NOFPS)                                      CTL2      882
      C                                                                   CTL2      883
      C                                                                   CTL2      884
      C      1.2.12 UPDATING DERIVATIVES FOR INTENSITY                    CTL2      885
      C            561  FOR BOTTOM REFLECTIONS                            CTL2      886
      C            562 FOR SURFACE REFLECTIONS                            CTL2      887
      C            563  FOR SECTOR CROSSINGS                              CTL2      888
      C            564 FOR REGION CROSSINGS                               CTL2      889
      C            QFAC3 IS USED FOR DISCONTINUITIES IN IDERV AND IS ONLY CTL2      890
      C      USED WHEN IOFLAG .GT. 0                                      CTL2      891
      C                                                                   CTL2      892
      C
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                  559 CONTINUE                                                      CTL2     893
                      QHORZ = X1 * SECTH7                                           CTL2     894
                      TOERV= TOERV*C1/C0                                            CTL2     895
1030                  IQFLAG  =  0                                                  CTL2     896
                      IF(IBOT.EQ.0) GO TO 562                                       CTL2     897
                  561 QFAC1  =  CURV                                                CTL2     898
                      IQFLAG  =  1                                                  CTL2     899
                      QFAC3  =   QVERT*COS(PSI)/SIN(PSI)                            CTL2     900
1035                  GO TO 568                                                     CTL2     901
                  562 IF(IBD.EQ.0) GO TO 568                                        CTL2     902
                      IF(ISURF.EQ.0) GO TO 563                                      CTL2     903
                      PSI  = -T1                                                    CTL2     904
                      GO TO 561                                                     CTL2     905
1040              563 QFAC1  =  -CURV                                               CTL2     906
                      IQFLAG  =  2                                                  CTL2     907
                      IF(JLINE.EQ.0) GO TO  564                                     CTL2     908
                C     BETAB=T1+ATAN(AR(IREG,JLINE))                                 CTL2     909
                      BETAB=T1+ATAN(AB(     JLINE))                                 CTL2     910
1045                  GO TO 566                                                     CTL2     911
                  564 BETAB  =  T1-1.5707963                                        CTL2     912
                  566 QFAC3  =  QVERT*COS(BETAB)/SIN(BETAB)                         CTL2     913
                C                                                                   CTL2     914
                C         1.2.13 UPDATE TRANSMISSION LOSS                           CTL2     915
1050            C                                                                   CTL2     916
                  568 CONTINUE                                                      CTL2     917
                      TSLOSS =  ABS (QVER) * QHORZ) / 9.00                          CTL2     918
                      SLOSS = 10.00 * ALOG10 (AMAX1 (1.00, TSLOSS))                 CTL2     919
                      TLOSS          =     SLOSS + BLOSS                            CTL2     920
1055                  IF (TLOSS .GE. DB150) GO TO 801                               CTL2     921
                      IF(IARV.EQ.0) GO TO 580                                       CTL2     922
                C                                                                   CTL2     923
                C         1.2.14 STORE ARRIVAL INFORMATION                          CTL2     924
                C                                                                   CTL2     925
1060            C              IF RAY HAS A HORIZONTAL ARRIVAL STORE AS             CTL2     926
                C         ARRIVAL - HORIZONTAL - ARRIVAL                            CTL2     927
                C                                                                   CTL2     928
                C              580  STORE HORIZONTAL IN SIGNATURE                    CTL2     929
                C              585  BOTTOM HORIZONTAL PRECEDED BY BR NOT COUNTED    CTL2     930
1065            C              587  TURN OFF HORIZONTAL FLAG                        CTL2     931
                C                                                                   CTL2     932
                  570 CONTINUE                                                      CTL2     933
                      NARV(LDEPTH)  =  NARV(LDEPTH) + 1                             CTL2     934
                      INARV          =     NARV(LDEPTH)                             CTL2     935
1070                  ISIG(LDEPTH,INARV) = NSR * I01 + NSH * I02 +                  CTL2     936
                     1                     NBR * I03 + NBH * I04                    CTL2     937
                      LASTEV  =  0                                                  CTL2     938
                      NCS(LDEPTH,INARV) = NC                                        CTL2     939
                      XI(LDEPTH,INARV) = 1.00 / TSLOSS                              CTL2     940
1075                  ANGLE(LDEPTH,INARV) = TDG                                     CTL2     941
                      RI(LDEPTH,INARV) = XNM                                        CTL2     942
                      TI(LDEPTH,INARV)  =  TIME                                     CTL2     943
                      IF (INARV .EQ. INTCUT) GO TO 802                              CTL2     944
                      IF(KPRNT.EQ.1)                                                CTL2     945
1080                 1WRITE(6,107)XNM,Y1,TDG,TIME,TLOSS,NBH,NBR,NSH,NSR,NC,(NARV(II),  CTL2     946
                     2       II=1,NDEPS)                                          CTL2     947
                  580 IF(IHORZ.EQ.0) GO TO 590                                      CTL2     948
                C                                                                   CTL2     949
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NORDA BENCH MARK PACKAGE DOCUMENT.(U)
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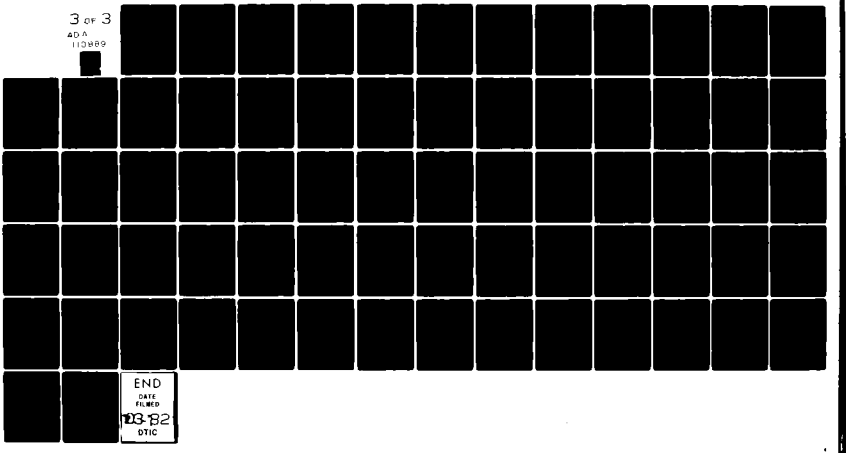
NL



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                C       STORE HORIZONTAL IN SIGNATURE                                   CTL2      950
                C                                                                       CTL2      951
      1085      C                                                                       CTL2      952
                      IF(THETA0.LT.0.) GO TO 585                                        CTL2      953
                      NSH             =    NSH + 1                                      CTL2      954
                      LASTEV  =  0                                                      CTL2      955
                      IR              =    0                                            CTL2      956
      1090            GO TO 586                                                         CTL2      957
                    585 IF(LASTEV.EQ.2)GO TO 587                                        CTL2      958
                      LASTEV  =  1                                                      CTL2      959
                      NBH             =    NBH + 1                                      CTL2      960
                      IR              =    2                                            CTL2      961
      1095            586 K           =    K + 1                                        CTL2      962
                      CALL JPUTB (ISEQ(1),6*K-5,6,IR)                                   CTL2      963
                     587  CONTINUE                                                      FIXFOR     80
                       IF( KPRNT .GT. 0)                                                FIXFOR     81
                     1WRITE(6,107)XNN,Y1,TOG,TIME,TLOSS,NBH,NBR,NSH,NSR,NC,(NARV(II),   CTL2      964
      1100           2       II=1,NDEPS)                                               CTL2      965
                      IF(IARV.EQ.0) GO TO 610                                           CTL2      966
                      IHZARV = 1                                                        CTL2      967
                      IOFLAG  =  0                                                      CTL2      968
                      IHORZ = 0                                                         CTL2      969
      1105            GO TO 570                                                         CTL2      970
                    590 IF(ISURF.EQ.0) GO TO 600                                        CTL2      971
                C                                                                       CTL2      972
                C         1.2.15 STORE SURFACE REFLECTION                               CTL2      973
                C                                                                       CTL2      974
      1110            LASTEV  =  0                                                      CTL2      975
                      IR              =    1                                            CTL2      976
                      NSR             =    NSR + 1                                      CTL2      977
                    596 K             =    K + 1                                        CTL2      978
                      CALL JPUTB (ISEQ(1),6*K-5,6,IR)                                   CTL2      979
      1115            T1 = -T1                                                          CTL2      980
                      TOG  =  T1*57.29577951                                            CTL2      981
                       IF( KPRNT .GT. 0)                                                FIXFOR     82
                     1WRITE(6,107)XNN,Y1,TOG,TIME,TLOSS,NBH,NBR,NSH,NSR,NC,(NARV(II),   CTL2      983
                     2       II=1,NDEPS)                                              CTL2      984
      1120            GO TO 610                                                         CTL2      985
                    600 IF(IBOT.EQ.0) GO TO 610                                         CTL2      986
                C                                                                       CTL2      987
                C         1.2.16 STORE BOTTOM REFLECTION                                CTL2      988
                C                                                                       CTL2      989
      1125            TOLD = T1                                                         CTL2      990
                      IF(KPRNT.GE.1)                                                    CTL2      991
                     1WRITE(6,107)XNN,Y1,TOG,TIME,TLOSS,NBH,NBR,NSH,NSR,NC,(NARV(II),   CTL2      992
                     2       II=1,NDEPS)                                              CTL2      993
                      NBR  =  NBR + 1                                                   CTL2      994
      1130      C                                                                       CTL2      995
                C                                                                       CTL2      996
                C                                                                       CTL2      997
                C         SAVE XNN,AND PSI TO BE USED IN PARTS (PROF) TO                CTL2      998
                C       CALCULATE THE BOTTOM LOSS.                                      CTL2      999
      1135      C                                                                       CTL2     1000
                C                                                                       CTL2     1001
                      WRITE(11BOT)XNN,PSI                                               CTL2     1002
                      BLOSS=BLOSS+FLOSS(XNN,PSI,W0)                                     CTL2     1003
                      TLOSS  =  SLOSS + BLOSS                                           CTL2     1004
      1140            IR  =  IFACET + 2                                                 CTL2     1005
```

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                      IF(LASTEV.NE.1) GO TO 605                                  CTL2   1006
                C                                                                CTL2   1007
                C         IF LAST EVENT WAS BOTTOM HORIZONTAL REMOVE FOR SIGNATURE CTL2   1008
                C                                                                CTL2   1009
          1145        NBH  =  NBH - 1                                            CTL2   1010
                      K  = K-1                                                   CTL2   1011
                      IF (K .EQ. 1) IFXH(I) = 0                                  CTL2   1012
                  605 LASTEV  =  2                                               CTL2   1013
                      K           =    K + 1                                     CTL2   1014
          1150        CALL JPUTR (ISEQ(1),6*K-5,6,IR)                            CTL2   1015
                      T1    = 2. * PSI + TOLD                                    CTL2   1016
                      TDG  =  T1*57.29577951                                     CTL2   1017
                       IF( KPRNT .GT. 0)                                         FIXFOR   83
                     1WRITE(6,107)XNM,Y1,TDG,TIME,TLOSS,NBH,NBR,NSH,NSR,NC,(NARV(II),  CTL2   1019
          1155       2      II=1,NDEPS)                                         CTL2   1020
                C                                                                CTL2   1021
                C                                                                CTL2   1022
                C         WRITE REFLECTED ANGLE TO TRAJECTORY FILE.              CTL2   1023
                C                                                                CTL2   1024
          1160        WRITE(TRAJCT) XNM,Y1,T1                                    CTL2   1025
                C                                                                CTL2   1026
                      IF (T1 .GT. ANGMXT) GO TO 803                              CTL2   1027
                  610 IF(IBO.EQ.0) GO TO 770                                     CTL2   1028
                C                                                                CTL2   1029
          1165  C         1.2.17 UPDATE IREG AND JSEC                            CTL2   1030
                C                                                                CTL2   1031
                C     IF ((JLINE .EQ. 0) .OR. (X1 .EQ. XBDRY(IREG+1))) GO TO 640 CTL2   1032
                C     IF (SIN(T1)/COS(T1)+AB(IREG,JLINE)) 620,770,630            CTL2   1033
                      READ(PROFILE)XBDRY2                                        CTL2   1034
          1170        BACKSPACE PROFILE                                          CTL2   1035
                      IF ((JLINE .EQ. 0) .OR. (X1 .EQ. XBDRY2)) GO TO 640        CTL2   1036
                      IF (SIN(T1)/COS(T1)+AB(     JLINE)) 620,770,630            CTL2   1037
                  620 JSEC = JLINE                                               CTL2   1038
                      GO TO 770                                                  CTL2   1039
          1175        630 JSEC = MAX0(1,JLINE-1)                                 CTL2   1040
                      GO TO 770                                                  CTL2   1041
                  640 IREG = IREG+1                                              CTL2   1042
                      IF(IREG.GT.NREGS) GO TO 804                                CTL2   1043
                      CALL GETPRO(IREG)                                          CTL2   1044
          1180  C     NJ=NSECS(IREG)                                             CTL2   1045
                      CALL GETDAN(IREG)                                          CTL2   1046
                      NJ=NUMSEC                                                  CTL2   1047
                      DO 650 JSEC = 1,NJ                                         CTL2   1048
                C     IF (Y1-YBDRY(IREG,JSEC)) 660,670,650                       CTL2   1049
          1185        IF (Y1-YBDRY(     JSEC)) 660,670,650                       CTL2   1050
                  650 CONTINUE                                                   CTL2   1051
                      JSEC = NJ                                                  CTL2   1052
                      GO TO 770                                                  CTL2   1053
                  660 JSEC = JSEC - 1                                            CTL2   1054
          1190        GO TO 770                                                  CTL2   1055
                  670 IJSEC = JSEC                                               CTL2   1056
                      DO 680 JSEC = IJSEC,NJ                                     CTL2   1057
                C     IF (Y1 .NE. YBDRY(IREG,JSEC)) GO TO 660                    CTL2   1058
                      IF (Y1 .NE. YBDRY(     JSEC)) GO TO 660                    CTL2   1059
          1195  C     IF (SIN(T1)/COS(T1)+AB(IREG,JSEC)) 680,690,770             CTL2   1060
                      IF (SIN(T1)/COS(T1)+AB(     JSEC)) 680,690,770             CTL2   1061
                  680 CONTINUE                                                   CTL2   1062
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                      JSEC = NJ                                                  CTL2    1063
                      GO TO 770                                                  CTL2    1064
1200          C 698   GUP=AC(IREG,JSEC-1)*SIN(T1)+BC(IREG,JSEC-1)*COS(T1)       CTL2    1065
              698     GUP=AC(     JSEC-1)*SIN(T1)+BC(     JSEC-1)*COS(T1)       CTL2    1066
              C       GDN=AC(IREG,JSEC  )*SIN(T1)+BC(IREG,JSEC  )*COS(T1)       CTL2    1067
                      GDN=AC(     JSEC  )*SIN(T1)+BC(     JSEC  )*COS(T1)       CTL2    1068
                      SUP = SIGN(1.,GUP)                                         CTL2    1069
1205                  SDN = SIGN(1.,GDN)                                         CTL2    1070
                      IF(SUP-SDN) 740,700,710                                    CTL2    1071
                700   IF(SUP) 770,770,660                                        CTL2    1072
                710   IF(T1)   770,720,660                                       CTL2    1073
                720   IF(THETA0)660,730,770                                      CTL2    1074
1210                  IF(THETLS)770,770,660                                      CTL2    1075
                740   CONTINUE                                                   CTL2    1076
              C                                                                  CTL2    1077
              C       PRINT MESSAGE THAT RAY BECAME AXIAL AND WAS CUT            CTL2    1078
              C                                                                  CTL2    1079
1215                  WRITE(6,745)                                               CTL2    1080
                745   FORMAT(1H0,/////35HRAY BECAME AXIAL - TRACE TERMINATED     )CTL2    1081
                      GO TO 900                                                  CTL2    1082
              C                                                                  CTL2    1083
              C         1.2.18 CHECK IF RAY SHOULD BE CUT                        CTL2    1084
1220          C                                                                  CTL2    1085
                770   CONTINUE                                                   CTL2    1086
                      IF (X1 .GE. ENDX) GO TO 804                                CTL2    1087
                      IF (ABS(T1) .GE. ANGMXT) GO TO 803                         CTL2    1088
                      IF (NRR .GE. NBRMAX) GO TO 805                             CTL2    1089
1225                  IF(K .GE. KCUT .OR. MAX0(NRR,NBH,NSR,NSH) .GE. NSHRR) GO TO 806  CTL2  1090
                       XTN=X1/6876.1                                             FIXFOR    84
                       TTN=T1*57.29577951                                        FIXFOR    85
              C ***************************************************************  FIXFOR    86
              C                                                                  FIXFOR    87
1230          C                          JP=7 FOR DEBUG.                         FIXFOR    88
              C                                                                  FIXFOR    89
              C ***************************************************************  FIXFOR    90
                      JP = 7                                                     CTL2    1091
                      IF (JPRNT .GE. 1)                                          CTL2    1092
1235                 1   WRITE(6,1005) JP,XTN,Y1,TTN,IREG,JSEC,(INDIC(II),II=1,6)  FIXFOR  91
              C                                                                  CTL2    1094
              C         1.2.19 RAY NOT CUT - UPDATE ALL FLAGS AND VARIABLES. GO TO  CTL2  1095
              C         NEXT STEP AT 400                                         CTL2    1096
              C                                                                  CTL2    1097
1240                  LINFLG(1)=0                                                CTL2    1098
                      LINFLG(2) = 0                                              CTL2    1099
                      LINFLG(3) = 0                                              CTL2    1100
                      IF (IACT .EQ. 1) LINFLG(3) = IFACET                        CTL2    1101
                      IF (IARV .EQ. 1) LINFLG(2) = LDEPTH                        CTL2    1102
1245                  IF (IRD .NE. 0) LINFLG(1) = JLINE                          CTL2    1103
                      IF(T1   .NE.0.) THETLS = T1                                CTL2    1104
                      Y0 = Y1                                                    CTL2    1105
                      X0 = X1                                                    CTL2    1106
                      THETA0 = T1                                                CTL2    1107
1250                  C0  =  C1                                                  CTL2    1108
                      IF ((KPRNT.EQ.2) .OR. (KPRNT.EQ.1 .AND. OVERT.EQ.0.00))    CTL2    1109
                     1WRITE(6,187)XNM,Y0,TOG,TIME,TLOSS,NRH,NBR,NSH,NSR,NC,(NARV(II),  CTL2  1110
                     2       II=1,NDEPS)                                         CTL2    1111
                      GO TO 400                                                  CTL2    1112
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1255          C                                                                  CTL2     1113
              C         1.2.28 RAYS CUT - PRINT APPROPRIATE MESSAGES IF KPRNT .GT. 0   CTL2     1114
              C         AND GO TO 900 WHERE ARRIVAL INFORMATION STORED           CTL2     1115
              C                                                                  CTL2     1116
              C                                                                  CTL2     1117
1260            880 CONTINUE                                                     CTL2     1118
                    WRITE (6,881)                                              CTL2     1120
                881 FORMAT (1H0,20X,33H*** RAY CUT - RAY TURNED BACK ***)      CTL2     1121
                    GO TO 900                                                  CTL2     1122
              C                                                                CTL2     1123
1265            881 CONTINUE                                                   CTL2     1124
                    WRITE (6,882) DB150                                        CTL2     1126
                882 FORMAT (1H0,20X,40H*** RAY CUT - TRANSMISSION LOSS EXCEEDED,  CTL2     1127
                   1          F8.2,7H DB ***)                                  CTL2     1128
                    GO TO 900                                                  CTL2     1129
1270          C                                                                CTL2     1130
                882 CONTINUE                                                   CTL2     1131
                    WRITE (6,883)                                              CTL2     1133
                883 FORMAT (1H0,20X,39H*** RAY CUT - MAX ARRIVALS EXCEEDED ***)  CTL2     1134
                    GO TO 900                                                  CTL2     1135
1275          C                                                                CTL2     1136
                883 CONTINUE                                                   CTL2     1137
                    WRITE (6,884)                                              CTL2     1139
                884 FORMAT (1H0,20X,37H*** RAY CUT - RAY ANGLE TOO STEEP ***)  CTL2     1140
                    GO TO 900                                                  CTL2     1141
1280          C                                                                CTL2     1142
                884 CONTINUE                                                   CTL2     1143
                     IF( KPRNT .LE. 0) GO TO 840                               9NOV77     44
                    WRITE (6,885)                                              CTL2     1145
                885 FORMAT (1H0,20X,29HRAY HAS REACHED MAXIMUM RANGE)          CTL2     1146
                    GO TO 900                                                  CTL2     1147
1285          C                                                                CTL2     1148
                885 CONTINUE                                                   CTL2     1149
                    WRITE (6,886)                                              CTL2     1151
                886 FORMAT (1H0,20X,25H*** RAY CUT - MAX BOTTOM ,              CTL2     1152
1290               1                  24HREFLECTIONS EXCEEDED ***)             CTL2     1153
                    GO TO 900                                                  CTL2     1154
              C                                                                CTL2     1155
                886 CONTINUE                                                   CTL2     1156
                    WRITE (6,887)                                              CTL2     1158
1295            887 FORMAT (1H0,20X,45H*** RAY CUT - MAX TURNING EVENTS EXCEEDED ***)  CTL2     1159
                     GO TO 900                                                 9NOV77     45
              C                                                                9NOV77     46
               900   CONTINUE                                                  9NOV77     47
                     XTN=X1/6876.1                                             9NOV77     48
1300                 WRITE(6,895) XTN                                          9NOV77     49
               895   FORMAT(34X, 12HRANGE(NM) = , F8.2)                        9NOV77     50
              C                                                                CTL2     1160
              C         1.3 PROCESSING ARRIVAL INFORMATION FOR EACH RAY        CTL2     1161
              C                                                                CTL2     1162
1305          C              WHETHER RAY WAS TRACED OR READ FORM INTAPE THE ARRIVAL  CTL2     1163
              C         INFORMATION IS WRITTEN ONTO SCRATCH DISK - ONE PER SOURCE  CTL2     1164
              C         DEPTH                                                  CTL2     1165
               840  CONTINUE                                                   CTL2     1170
              C                                                                15AUG78    87
1310                 DO  930  KK   =    1,NDEPS                               CTL2     1172
                     KLKL(KK,I) = NARV(KK)                                     CTL2     1174
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                      IABC = KLKL(KK,I)                                          CTL2    1175
                C                                                                15AUG78   88
                      DO 920 II=1,IABC                                           CTL2    1176
1315                  ARVREC(2) = RI(KK,II)                                      15AUG78   89
                      ARVREC(3) = XI(KK,II)                                      15AUG78   90
                      ARVREC(4) = ANGLE(KK,II)                                   15AUG78   91
                      IARVRC(5) = ISIG(KK,II)                                    15AUG78   92
                      ARVREC(6) = TI(KK,II)                                      15AUG78   93
1320                  IARVRC(7) = NCS(KK,II)                                     15AUG78   94
                C                                                                15AUG78   95
                C        WRITE THE DIRECT ACCESS COMBINED ARRIVAL DATA ARRAY RECORD.  15AUG78   96
                C        (RECORD 1 CONTAINS THE ACCESS KEY -- WHERE I = RAY INDEX.   15AUG78   97
                C        KK = NO. SOURCE DEPTHS, II = NO. ARRIVALS)                  15AUG78   98
1325            C                                                                15AUG78   99
                      KEYNEW = I * 10000 + KK * 1000 + II                        15AUG78  100
                      CALL PUT(NEWFIT,ARVREC)                                    15AUG78  101
                      NPUTS = NPUTS + 1                                          15AUG78  102
                920   CONTINUE                                                   CTL2    1187
1330              930 CONTINUE                                                   CTL2    1188
                      WRITE (IDISC) (ISEQ(K123),K123=1,IWORDS)                   CTL2    1189
                C                                                                CTL2    1190
                C                                                                CTL2    1191
                C          IF THIS IS A RAY FROM A PREVIOUS RUN,THE END OF TRAJECTORY  CTL2    1192
1335            C        MARK HAS ALREADY BEEN WRITTEN AND THE BOTTOM BOUNCE DATA COPIED CTL2    1193
                C                                                                CTL2    1194
                C                                                                CTL2    1195
                      IF(IANG(I) .NE. 0) GO TO 940                               CTL2    1196
                      NBR1 = NBR + 1                                             CTL2    1197
1340                  IF(NBR1 .GT. 25) GO TO 937                                 24JAN75   8
                 932  DO 935 LOOP=NBR1,25                                        CTL2    1204
                C                                                                CTL2    1205
                C                                                                CTL2    1206
                C          RNEG=-1.0 IN A DATA STATEMENT ABOVE. NEGATIVE RANGE IS    CTL2    1207
1345            C        IMPOSSIBLE SO THIS WILL TELL PARTS (WHICH CALCULATES THE  CTL2    1208
                C        BOTTOM LOSS)THAT THIS IS JUST A FILLER.                   CTL2    1209
                         WRITE(IIBOT) RNEG,RNEG                                  CTL2    1210
                  935 CONTINUE                                                   CTL2    1211
                C                                                                CTL2    1212
1350             937  CONTINUE                                                   24JAN75   9
                C                                                                CTL2    1213
                C          WRITE A RECORD OF                                     FIXFOR    92
                C                   -1.0,-1.0,-1.0                               FIXFOR    93
                C          TO THE FILE TRAJCT TO DENOTE THE END OF A TRAJECTORY. FIXFOR    94
1355            C                                                                CTL2    1216
                C                                                                CTL2    1217
                      WRITE(TRAJCT) RNEG,RNEG,RNEG                               CTL2    1218
                C                                                                CTL2    1219
                C                                                                CTL2    1220
1360              940 CONTINUE                                                   CTL2    1221
                      REWIND IIBOT                                               CTL2    1222
                C                                                                15AUG78  103
                C ***************************************************************15AUG78  104
                C        CLOSE NEW AND/OR OLD ARRIVALS FILE(S)                   15AUG78  105
1365            C ***************************************************************15AUG78  106
                C                                                                15AUG78  107
                C        CLOSE THE NEW DIRECT ACCESS ARRIVAL FILE.               15AUG78  108
                C                                                                15AUG78  109
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                      CALL CLOSEM(NEWFIT)                                          15AUG78   110
      1370          C                                                              15AUG78   111
                    C                                                              15AUG78   112
                    C     IF THE OLD DIRECT ACCESS ARRIVAL FILE WAS OPENED, CLOSE IT.  15AUG78   113
                    C                                                              15AUG78   114
                      IF(INTAPE .GT. 0) CALL CLOSEM(OLDFIT)                        15AUG78   115
      1375          C                                                              CTL2      1229
                    C                                                              CTL2      1230
                    C       CALL OPNOLF USED TO BE HERE.                           CTL2      1231
                    C                                                              CTL2      1232
                    C                                                              CTL2      1233
      1380           107   FORMAT(8X,F9.4,3X,F10.4,3X,F8.3,3X,F9.4,3X,F7.2,3X,4I4,I5,3X,  FIXFOR    95
                     1      5I8)                                                   FIXFOR    96
                     1000  FORMAT(' JP=',I1,3X,F9.4,3X,F10.4,3X,F8.3,'   IFLAG2=',I1)  FIXFOR    97
                     1002  FORMAT(' JP=',I1,3X,F9.4,3X,F10.4,3X,F8.3)              FIXFOR    98
                     1004  FORMAT(' JP=',I1,3X,F9.4,3X,F10.4,3X,F8.3,3X,'IROT=',I1,3X,  01MAR79   24
      1385           2                 'IFACET=',I3)                              01MAR79   25
                     1005  FORMAT(' JP=',I1,3X,F9.4,3X,F10.4,3X,F8.3,'   REGION NO.=',I3,  FIXFOR    99
                     1   '   SECTION NO.=',I3,                                    FIXFOR    100
                     2       '   IARV=',I1,'   IHORZ=',I1,'   ISURF=',I1,'   IROT=',I1,  FIXFOR    101
                     3       '   IRD=',I1,'   JLINE=',I3)                         FIXFOR    102
      1390          C                                                              FIXFOR    103
                    C                                                              FIXFOR    104
                      RETURN                                                       CTL2      1234
                      END                                                          CTL2      1235
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CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
262	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
291	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
299	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
1310	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
1	CTL2	1	1392

VARIABLES	SN	TYPE	RELOCATION								
3734	A	REAL			REFS	679	720	DEFINED	635	651	
0	AB	REAL	ARRAY	QUANTS	REFS	34	465	635	1044	1172	1196
174	ABOT	REAL	ARRAY	BOTTOM	REFS	52					
1458	AC	REAL	ARRAY	QUANTS	REFS	34	476	478	600	1201	1203
14	AL	REAL		BOTREF	REFS	51	621	720	863	DEFINED	620
1762	ALPHR	REAL	ARRAY	QUANTS	REFS	34	595	604	606	943	
1	ANGARK	REAL	ARRAY	ARREAK	REFS	45					
5435	ANGLE	REAL	ARRAY		REFS	11	1317	DEFINED	273	1075	
0	ANGMAX	REAL		PLTIN	REFS	47					
1	ANGMIN	REAL		PLTIN	REFS	47					
3625	ANGMXT	REAL			REFS	1162	1223	DEFINED	128		

VARIABLES	SN	TYPE	RELOCATION								
4031	ARVREC	REAL	ARRAY		REFS	20	22	23	1327	DEFINED	1315	1316
					1317	1319						
4040	ARVRE2	REAL	ARRAY		REFS	19	22	23	269	271	272	273
					275							
3735	B	REAL			REFS	679	720	DEFINED	637	653		
312	BB	REAL	ARRAY	QUANTS	REFS	34	637					
272	BBOT	REAL	ARRAY	BOTTOM	REFS	52						
1136	BC	REAL	ARRAY	QUANTS	REFS	34	476	478	489	499	505	563
					600	1201	1203					
2113	BEGINX	REAL		/ /	REFS	2	405					
8	BEGINY	REAL		DEPTHS	REFS	49	406	449	468			
4007	BETAB	REAL			REFS	2*1047	DEFINED	1044	1046			
15	BL	REAL		BOTREF	REFS	51	720	863	DEFINED	621		
3712	BLOSS	REAL			REFS	1009	1054	1138	1139	DEFINED	548	1138
624	CC	REAL	ARRAY	QUANTS	REFS	34						
3767	CCAST	REAL			REFS	962	DEFINED	960				
2	CONFILE	INTEGER		CFILL	REFS	43	44					
3731	COSAL	REAL			REFS	912	963	964	DEFINED	606		
3727	COSPO	REAL			REFS	600	913	936	960	DEFINED	596	
3676	COSTHZ	REAL			REFS	476	478	600	620	915		
					DEFINED	581						
4001	CTC	REAL			REFS	981	1005	DEFINED	975	994		
3725	CURV	REAL			REFS	602	608	610	617	618	654	711
					712	846	911	928	1032	1048		
					DEFINED	593	600	607				
4	C0	REAL		BOTREF	REFS	51	600	2*915	960	962	1029	
					DEFINED	543	1250					
6	C1	REAL		BOTREF	REFS	51	915	975	994	1029	1250	
					DEFINED	704	757	860	874	976	981	998
					1005							
742	DB150	REAL		/ /	REFS	2	1055	1266				
8	DEP	REAL	ARRAY	BOTTOM	REFS	52	177					
3770	DETAC	REAL			REFS	963	964	DEFINED	962			
3715	DQ	REAL			REFS	610	918	DEFINED	551	913	915	
4003	DQQ	REAL			REFS	996	997	DEFINED	991			
1	DRPLT	REAL		SCALEF	REFS	50						
3760	DSPC	REAL			REFS	940	941	DEFINED	939			
10	DT	REAL		BOTREF	REFS	51	893	978	999	DEFINED	711	712
					758	861	875					
3637	DUM *	REAL			DEFINED	181						
3771	DXC	REAL			REFS	965	969	972	978	DEFINED	963	969
3757	DXIC	REAL			REFS	938	939	963	964	DEFINED	936	938
3744	DXR	REAL			REFS	679	709	711	758	787	791	848
					861	912	DEFINED	741	755			
3747	DXRSAV	REAL			REFS	741	DEFINED	709				
3755	DXSI	REAL			REFS	913	938	DEFINED	912			
3772	DYC	REAL			REFS	967	970	972	978	DEFINED	964	970
3745	DYR	REAL			REFS	679	710	711	758	787	791	848
					861	912	DEFINED	742	756			
3750	DYRSAV	REAL			REFS	742	DEFINED	710				
1523	ENDX	REAL		/ /	REFS	2	1222					
763	FREQR	REAL	ARRAY	/ /	REFS	2						
8	FSAVE	REAL	ARRAY	FINPUT	REFS	54						
3677	GON	REAL			REFS	480	1205	DEFINED	478	1203		
2274	GRAD	REAL	ARRAY	QUANTS	REFS	34	600	962				
3674	GUP	REAL			REFS	479	1204	DEFINED	476	1201		
3640	I	INTEGER			REFS	199	208	224	268	388	402	403

VARIABLES	SN	TYPE		RELOCATION							
					426	536	573	1147	1311	1312	1326	1338
					DEFINED	198						
4017	IARC	INTEGER			REFS	1314	DEFINED	1312				
1524	IANG	INTEGER	ARRAY	/ /	REFS	2	208	224	260	1338		
4023	IARV	INTEGER			REFS	9	1056	1101	1244	DEFINED	876	
4031	IARVRC	INTEGER	ARRAY		REFS	20	22	DEFINED	1318	1328		
4040	IARVR2	INTEGER	*UNDEF		REFS	19	22	274	276			
4027	IBD	INTEGER			REFS	9	1036	1163	1245	DEFINED	743	888
					845							
3671	IBEGIN	INTEGER			REFS	458	459	538	543	DEFINED	452	
2128	IBEGNP	INTEGER		/ /	REFS	2	452	462	466			
4026	IBOT	INTEGER			REFS	9	787	791	792	806	888	889
					1031	1121	1243	DEFINED	784	809	843	
3623	IDISC	INTEGER			DEFINED	125	I/O REFS	1331				
3753	IFACET	INTEGER			REFS	791	886	1140	1243			
3723	IFLAG1	INTEGER			REFS	676	679	720	DEFINED	578	650	
3737	IFLAG2	INTEGER			REFS	676	679	684	685	694	696	728
					730	732	848	858	863	872		
					DEFINED	655	656	847				
8	IFMIC	INTEGER		PLTINF	REFS	48						
241	IFXH	INTEGER	ARRAY	RAYS	REFS	46	DEFINED	426	536	573	1147	
1764	IFXHP	INTEGER	ARRAY	/ /	REFS	2						
4024	IHORZ	INTEGER			REFS	9	812	1082	DEFINED	759	818	842
					1104							
3720	IHZARV	INTEGER			DEFINED	575	1102					
3651	II	INTEGER			REFS	308	421	431	768	886	1015	1079
					1098	1117	1126	1153	1234	1251	1315	1316
					1317	1318	1319	1328	1376	DEFINED	388	428
					431	768	886	1015	1079	1098	1117	1126
					1153	1234	1251	1314				
48	IIBOT	INTEGER		FINPUT	REFS	54	DEFINED	126	I/O REFS	381	1137	1347
					1361							
4016	IJSEC	INTEGER			REFS	1192	DEFINED	1191				
4012	INARV	INTEGER			REFS	1070	1073	1074	1075	1076	1077	1078
					DEFINED	1069						
3717	IND	INTEGER			REFS	559	DEFINED	558				
3644	INDEXR	INTEGER			REFS	263	265	286	DEFINED	268		
4023	INDIC	INTEGER	ARRAY		REFS	8	649	768	886	1234		
					DEFINED	559						
756	INDISC	INTEGER	ARRAY	/ /	REFS	2						
741	INFILE	INTEGER		/ /	REFS	2						
2115	INTAPE	INTEGER		/ /	REFS	2	56	143	179	1374		
3626	INTCUT	INTEGER			REFS	1078	DEFINED	129				
1441	IOPT	INTEGER	ARRAY	/ /	REFS	2						
1	IOPTN	INTEGER		DEPTHS	REFS	49						
2455	IO1	INTEGER			REFS	1070	DEFINED	67				
2456	IO2	INTEGER			REFS	1070	DEFINED	67				
2457	IO3	INTEGER			REFS	1070	DEFINED	67				
2460	IO4	INTEGER			REFS	1070	DEFINED	67				
43	IPTR	INTEGER		FINPUT	REFS	54						
3711	IQFLAG	INTEGER			REFS	607	610	DEFINED	547	1038	1033	1041
					1103							
4013	IR	INTEGER			REFS	1096	1114	1150	DEFINED	1089	1094	1111
					1140							
3703	IREG	INTEGER			REFS	539	540	784	711	712	757	758
					768	787	791	868	861	874	875	886
					976	978	998	999	1177	1178	1179	1181

VARIABLES	SN	TYPE		RELOCATION							
					1234	DEFINED	538	1177			
11747	ISEQ	INTEGER	ARRAY		REFS	12	502	534	566	571	1096	1114
					1150	1331	DEFINED	284			
7013	ISIG	INTEGER	ARRAY		REFS	11	1318	DEFINED	274	1078		
4025	ISURF	INTEGER			REFS	9	1037	1106	DEFINED	813	844	
3646	ITEMP	INTEGER			REFS	268	DEFINED	265				
2115	ITON	INTEGER		/ /	REFS	56						
3636	IU	INTEGER			REFS	2*177	DEFINED	177				
2461	IWORDS	INTEGER			REFS	284	1331	DEFINED	68			
3672	JBEGIN	INTEGER			REFS	463	465	468	469	478	472	474
					2*476	2*478	489	499	505	541	543	
					DEFINED	460	469	472				
2117	JBEGNP	INTEGER		/ /	REFS	2	460	462				
2104	JDISC	INTEGER	ARRAY	/ /	REFS	2						
3733	JJ	INTEGER			REFS	635	637	656	719	DEFINED	633	
4038	JLINE	INTEGER			REFS	9	744	2*745	812	1042	1044	1171
					1172	1173	1175	1245	DEFINED	705	744	745
3655	JP	INTEGER			REFS	416	694	730	768	806	858	872
					886	1234	DEFINED	415	693	729	767	880
					857	871	885	1233				
2111	JPRNT	INTEGER		/ /	REFS	2	416	618	694	730	768	883
					806	858	872	886	1234			
3704	JSEC	INTEGER			REFS	563	3*598	595	3*608	604	606	633
					704	711	712	745	757	758	768	787
					791	860	861	874	875	886	943	962
					976	978	998	999	1185	1189	1191	1194
					1196	2*1201	2*1203	1234	DEFINED	541	1173	1175
					1183	1187	1189	1192	1198			
3666	K	INTEGER			REFS	502	534	561	566	571	1095	1096
					1113	1114	1146	1147	1149	1150	1225	
					DEFINED	430	500	586	564	568	1095	1113
					1146	1149						
41	KBOT	INTEGER		FINPUT	REFS	54						
3638	KCUT	INTEGER			REFS	1225	DEFINED	131				
3754	KO	INTEGER			REFS	836	DEFINED	835				
4031	KEYNEW	INTEGER			REFS	23	DEFINED	1326				
4040	KEYOLD	INTEGER			REFS	23	269	DEFINED	268			
628	KK	INTEGER		/ /	REFS	2	263	264	265	271	272	273
					274	275	276	284	2*1311	1312	1315	1316
					1317	1318	1319	1328	1326	DEFINED	262	284
					291	299	1310					
621	KL	INTEGER	ARRAY	/ /	REFS	2						
0	KLKL	INTEGER	ARRAY	/ /	REFS	2	1312	DEFINED	1311			
0	KLK2	INTEGER	ARRAY	OLDARY	REFS	30	263					
2112	KPRNT	INTEGER		/ /	REFS	2	308	431	676	787	824	927
					1079	1098	1117	1126	1153	2*1251	1282	
44	KPTR	INTEGER		FINPUT	REFS	54						
4028	K123	INTEGER			REFS	1331	DEFINED	1331				
3665	LASTEV	INTEGER			REFS	1091	1141	DEFINED	429	507	569	1072
					1088	1092	1110	1148				
3667	LDEPTH	INTEGER			REFS	2*449	829	830	834	837	838	841
					848	863	877	2*10E8	1069	1070	1073	1074
					1075	1076	1077	1244	DEFINED	448	828	832
					836							
4047	LINFLG	INTEGER	ARRAY		REFS	7	656	719	784	824	829	837
					DEFINED	440	441	442	449	463	470	1240
					1241	1242	1243	1244	1245			

VARIABLES	SN	TYPE	RELOCATION							
1437 LINFLT		INTEGER	/ /	REFS	2	442				
4822 LOOP	*	INTEGER		DEFINED	1341					
3647 NA		INTEGER		REFS	268	271	272	273	274	275	276
				DEFINED	267					
0 NANGLE		INTEGER	RAYS	REFS	46	198				
3645 NARRIV		INTEGER		REFS	264	267	DEFINED	263		
4852 NARV		INTEGER	ARRAY	REFS	8	431	1015	1068	1069	1079	1098
				1117	1126	1153	1251	1311	DEFINED	264	421
				1068							
3732 NBD		INTEGER		REFS	629	633	656	705	719		
				DEFINED	628						
3722 NBDRY		INTEGER		REFS	610	628	DEFINED	577	592		
3657 NBH		INTEGER		REFS	431	1015	1070	1079	1093	1098	1117
				1126	1145	1153	1225	1251	DEFINED	422	508
				570	1093	1145					
378 NBP		INTEGER	BOTTOM	REFS	52	2*177					
3668 NBR		INTEGER		REFS	431	1015	1070	1079	1098	1117	1126
				1129	1153	1224	1225	1251	1339		
				DEFINED	423	1129					
0 NBRK		INTEGER	ARREAK	REFS	45						
3627 NBRMAX		INTEGER		REFS	1224	DEFINED	130				
4021 NBR1		INTEGER		REFS	1340	1341	DEFINED	1339			
3664 NC		INTEGER		REFS	431	926	1015	1073	1079	1098	1117
				1126	1153	1251	DEFINED	428	926		
12885 NCS		INTEGER	ARRAY	REFS	12	1320	DEFINED	276	1073		
5 NDBY		INTEGER	SCALEF	REFS	50						
1448 NDEPS		INTEGER	/ /	REFS	2	262	308	428	431	448	828
				832	835	836	1015	1079	1098	1117	1126
				1153	1251	1310					
15884 NEWFIT		INTEGER	ARRAY	REFS	20	166	169	1327	1369		
37 NF		INTEGER	FINPUT	REFS	54						
36 NFREQ		INTEGER	FINPUT	REFS	54						
3634 NGETS		INTEGER		REFS	278	DEFINED	136	278			
0 NHORZ		INTEGER	HORIZO	REFS	40	590					
4 NI		INTEGER	PLTIN	REFS	47						
3705 NIND		INTEGER		REFS	558	DEFINED	542				
4015 NJ		INTEGER		REFS	1183	1187	1192	1198	DEFINED	1182	
42 NKBOT		INTEGER	FINPUT	REFS	54						
3633 NOLDIS		INTEGER		REFS	285	286	DEFINED	135	285		
743 NOPRNT		INTEGER	ARRAY / /	REFS	2						
758 NOPTS		INTEGER	ARRAY / /	REFS	2						
3621 NO21		LOGICAL		REFS	60	219	DEFINED	178	183		
0 NP		INTEGER	EXTRAN	REFS	41	118					
2 NPLOT		INTEGER	PLTINF	REFS	48						
3635 NPUTS		INTEGER		REFS	1328	DEFINED	137	1328			
2116 NRAYP		INTEGER	/ /	REFS	2						
3622 NREGS		INTEGER		REFS	1178	DEFINED	118				
3721 NROOTS		INTEGER		REFS	649	697	734	740	DEFINED	576	703
1 NRTCAL		INTEGER	PLTINF	REFS	48						
4 NRX		INTEGER	SCALEF	REFS	50						
3661 NSH		INTEGER		REFS	431	1015	1070	1079	1087	1098	1117
				1126	1153	1225	1251	DEFINED	424	501	565
				1087							
3631 NSHAR		INTEGER		REFS	1225	DEFINED	132				
3662 NSR		INTEGER		REFS	431	1015	1070	1079	1098	1112	1117
				1126	1153	1225	1251	DEFINED	425	1112	
0 NTLPLT		INTEGER	SCALEF	REFS	50						

VARIABLES	SN	TYPE		RELOCATION								
3632	NTRAJ	INTEGER			REFS	221	224	233	242	DEFINED	134	227
					233	242						
5	NUMCON	INTEGER		CFILL	REFS	43						
4	NUMPRO	INTEGER		CFILL	REFS	43						
6	NUMQAN	INTEGER		CFILL	REFS	43						
0	NUMSEC	INTEGER		FORGOT	REFS	42	590	1182				
2	NX	INTEGER		PLTIN	REFS	47						
3	NY	INTEGER		PLTIN	REFS	47						
3643	OLDANG	REAL			REFS	231	DEFINED	238				
3642	OLDD	REAL			REFS	231	DEFINED	230				
14741	OLDFIT	INTEGER	ARRAY		REFS	19	25	151	154	269	1374	
2465	OLDIDI	INTEGER			REFS	65	DEFINED	A1	I/O REFS	284		
2466	OLDIIB	INTEGER			REFS	64	DEFINED	A2	I/O REFS	292	300	
3641	OLDR	REAL			REFS	231	232	241	DEFINED	223	230	240
2463	OLDTRJ	INTEGER			REFS	63	182	DEFINED	79	I/O REFS	180	181
					188	223	230	240				
755	OUTAPE	INTEGER		/ /	REFS	2	61					
3766	PHIC	REAL			REFS	2*951	953	955	958	960		
					DEFINED	950	955	958				
3763	PHITMP	REAL			REFS	944	2*951	DEFINED	943			
3726	PHIB	REAL			REFS	596	597	2*951	DEFINED	595		
0	PROFILE	INTEGER		CFILL	REFS	43	44	I/O REFS	647	648	1169	1178
11	PSI	REAL		ROTREF	REFS	51	301	2*1034	1137	1138	1151	
					DEFINED	300	1038					
3	QANFILE	INTEGER		CFILL	REFS	43	44					
3713	QFAC1	REAL			REFS	608	610	DEFINED	549	1032	1040	
3714	QFAC3	REAL			REFS	608	610	DEFINED	550	1034	1047	
3710	QHORZ	REAL			REFS	610	1052	DEFINED	546	1028		
3716	QSIGN	REAL			REFS	919	925	DEFINED	552	925		
3707	QVERT	REAL			REFS	610	917	918	919	927	991	1034
					1047	1052	1251	DEFINED	545	918		
3756	QVERTP	REAL			REFS	936	2*991	DEFINED	917			
13	RAD	REAL		ROTREF	REFS	51	679	751	752	848	912	939
					969	970	DEFINED	618	622			
3624	RADIAN	REAL			REFS	128	DEFINED	127				
76	RANGE	REAL	ARRAY	BOTTOM	REFS	52	177					
4057	RI	REAL	ARRAY		REFS	11	1315	DEFINED	271	1076		
2462	RNEG	REAL			REFS	2*1347	3*1357	DEFINED	69			
3	RPLOT	REAL	ARRAY	PLTINF	REFS	48						
5	RTCAL	REAL	ARRAY	BBB	REFS	53						
3701	SDN	REAL			REFS	481	1206	DEFINED	480	1205		
3653	SECTHZ	REAL			REFS	1028	DEFINED	404				
3730	SINAL	REAL			REFS	912	963	964	DEFINED	604		
12	SINPB	REAL		ROTREF	REFS	51	940	941	2*947	DEFINED	597	
4000	SINP1	REAL			REFS	974	DEFINED	977	980			
3675	SINTHZ	REAL			REFS	476	478	483	600	620	751	755
					DEFINED	579						
3724	SINTZ2	REAL			REFS	752	756	DEFINED	580			
4011	SLOSS	REAL			REFS	1054	1139	DEFINED	1053			
3765	SPC	REAL			REFS	950	977	DEFINED	945	947		
3777	SPCC	REAL			REFS	980	DEFINED	974				
1	SPCFILE	INTEGER		CFILL	REFS	43	44					
3761	SPC1	REAL			REFS	945	DEFINED	940				
3762	SPC2	REAL			REFS	3*947	DEFINED	941				
3764	SPTP	REAL			REFS	2*947	DEFINED	944				
3700	SUP	REAL			REFS	481	482	1206	1207	DEFINED	479	1204
3673	TANTHZ	REAL			REFS	465	DEFINED	461				

VARIABLES	SN	TYPE		LOCATION								
3706	TDERV	REAL			REFS	608	610	918	936	1029		
					DEFINED	544	608	1029				
3692	TDG	REAL			REFS	416	431	1006	1075	1079	109A	1117
					1126	1153	1251	DEFINED	402	892	1116	1152
3776	THCAS	REAL			REFS	1015	DEFINED	972	1006			
1	THEO	REAL	ARRAY	RAYS	REFS	46	308	402	403			
5	THETAB	REAL		BOTREF	REFS	51	404	412	451	461	487	579
					580	581	595	679	684	721	746	848
					2*972	1086	1209	DEFINED	403	1249		
3670	THETLS	REAL			REFS	1210	DEFINED	451	1246			
3702	THFRST	REAL			REFS	560	DEFINED	490	535	572		
10371	TI	REAL	ARRAY		REFS	11	1319	DEFINED	275	1077		
3656	TIME	REAL			REFS	431	893	978	999	1077	1079	109A
					1117	1126	1153	1251	DEFINED	419	893	
3	TLMAX	REAL		SCALEF	REFS	50						
2	TLMIN	REAL		SCALEF	REFS	50						
4006	TLOSC	REAL			REFS	1015	DEFINED	1009				
3663	TLOSS	REAL			REFS	431	1055	1079	1098	1117	1126	1153
					1251	DEFINED	427	1054	1139			
4002	TMCAS	REAL			REFS	1015	DEFINED	978	999			
4014	TOLD	REAL			REFS	1151	DEFINED	1125				
2464	TRAJCT	INTEGER			REFS	62	DEFINED	80	I/O REFS	177	231	412
					900	1160	1357					
4010	TSLOSS	REAL			REFS	1053	1074	DEFINED	1052			
3743	TT	REAL			REFS	679	687	708	723	DEFINED	684	721
3746	TTN	REAL			REFS	694	730	768	806	858	872	886
					1234	DEFINED	687	723	761	802	851	865
					879	1227						
7	T1	REAL		BOTREF	REFS	51	746	761	802	848	851	865
					879	892	900	943	1038	1044	1046	1115
					1116	1125	1152	1160	1162	2*1172	2*1196	2*1201
					2*1203	1208	1223	1227	2*1246	1249		
					DEFINED	708	753	1115	1151			
2114	WO	REAL		/ /	REFS	2	1138					
0	XBDRY	REAL		XRANGE	REFS	39						
3736	XBDRY2	REAL			REFS	649	653	1171	DEFINED	647	1169	
13363	XI	REAL	ARRAY		REFS	12	1316	DEFINED	272	1074		
3658	XNM	REAL			REFS	301	431	900	1076	1079	109A	1117
					1126	1137	1138	1153	1160	1251		
					DEFINED	292	300	418	891			
3774	XNMC	REAL			REFS	1015	DEFINED	966	1000			
3741	XT	REAL			REFS	679	686	697	704	706	720	722
					733	734	DEFINED	685				
4004	XTC	REAL			REFS	1003	DEFINED	992				
3748	XTN	REAL			REFS	676	694	738	768	886	858	872
					886	1234	1300	DEFINED	675	686	722	760
					801	850	864	878	1226	1299		
3751	XTN0	REAL			REFS	787	DEFINED	785				
3752	XTN1	REAL			REFS	787	DEFINED	786				
8	X8	REAL		BOTREF	REFS	51	411	418	543	621	675	679
					685	733	751	754	785	848	915	965
					2*996	DEFINED	405	1248				
3654	X8NM	REAL			REFS	412	416	DEFINED	411			
2	X1	REAL		BOTREF	REFS	51	649	697	734	754	757	760
					786	801	848	850	860	863	864	874
					878	891	915	992	996	998	1000	1028
					1171	1222	1226	1248	1299	DEFINED	133	706

VARIABLES	SN	TYPE	RELOCATION									
					751	996	1083					
3773	X1C	REAL			REFS	966	976	DEFINED	965			
2684	YBDRY	REAL	ARRAY	QUANTS	REFS	34	468	2*590	1185	1194		
3775	YCAS	REAL			REFS	976	1015	DEFINED	967	1082		
0	YDEP	REAL	ARRAY	BRR	REFS	53	308	449	830	834	838	841
					848	863	877					
3742	YT	REAL			REFS	679	694	704	707	720	738	
4005	YTC	REAL			REFS	1004	DEFINED	993				
1	Y0	REAL		BOTREF	REFS	51	412	416	431	543	621	676
					679	752	787	824	827	830	838	848
					967	2*997	1251	DEFINED	406	1247		
3	Y1	REAL		BOTREF	REFS	51	757	768	787	806	824	827
					834	841	848	858	860	863	872	874
					886	900	993	997	998	1002	1079	1098
					1117	1126	1153	1160	1185	1194	1234	1247
					DEFINED	707	752	814	877	997	1084	

FILE NAMES	MODE										
TAPE6	FMT		WRITES	184	199	308	416	431	484	618	676
			694	730	768	787	803	806	824	858	872
			886	934	989	1015	1079	1098	1117	1126	1153
			1215	1234	1251	1261	1266	1272	1277	1283	1288
			1294	1300							

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES							
ALOG10	REAL	1	LIBRARY	1053							
ASIN	REAL	1	LIBRARY	950							
ATAN	REAL	1	LIBRARY	972	1044						
CLOSEM		1		1369	1374						
COS	REAL	1	LIBRARY	404	581	596	606	960	972	1034	1047	1172
				1196	1201	1203					
EOF	REAL	1		182							
FILEDA		19		151	166						
FLOSS	REAL	3		1138							
GET		4		269							
GETPRO		1		459	539	1179					
GETQAN		1		458	540	1181					
JPUTB		4		582	534	566	571	1096	1114	1158	
LINCIR		13		679	848						
LINLIN		9		720	863						
MPHITB		6		791							
OPENM		2		154	169						
PUT		2		1327							
SIN	REAL	1	LIBRARY	579	580	597	604	972	1034	1047	1172	1196
				1201	1203							
TAN	REAL	1	LIBRARY	461							
TSUBC	REAL	4		711	758	861	978					
TSUBL	REAL	2		712	875	999						
VELOC	REAL	4		543	784	757	868	874	976	998		

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES						
ABS	REAL	1	INTRIN		682	913	915	936	939	960	1052	1223
AMAX1	REAL	0	INTRIN		947	951	1053					
AMIN1	REAL	0	INTRIN		947	951						
IABS	INTEGER	1	INTRIN		452	460						
MAX0	INTEGER	0	INTRIN		1175	1225						

INLINE FUNCTIONS TYPE ARGS DEF LINE REFERENCES
SIGN REAL 2 INTRIN 479 480 600 944 1204 1205

STATEMENT LABELS				DEF LINE	REFERENCES							
24	80			157	143							
0	85		INACTIVE	183	182							
2586	87	FMT		185	184							
61	90			187	179	182						
2526	95	FMT		200	199							
2683	106	FMT		309	308							
3514	107	FMT		1380	431	1015	1079	1098	1117	1126	1153	1251
0	109			421	420							
74	180			224	221	243						
108	185			230	232							
118	190			240	224	241						
116	200			253	219	234						
0	210			277	267							
0	220			278	262							
164	240			284	294							
0	250			293	291							
177	255			299	286							
0	257			302	299							
287	260			304	288							
0	349			458	448							
315	358			465	471							
0	360		INACTIVE	466	465							
323	370			472	465	482	2*483					
325	380			474	465							
0	382		INACTIVE	482	481							
342	384			483	481							
344	386			484	481							
2671	387	FMT		485	484							
347	390			487	462	466	468	473	474	2*482	483	
0	391		INACTIVE	489	487							
0	392		INACTIVE	498	489							
355	393			499	487							
357	394			500	489							
364	395			505	487							
366	396			506	489							
372	398			535	499	503	505					
375	399			537	491							
415	400			558	1254							
0	401			559	558							
0	402		INACTIVE	564	563							
431	403			568	563							
435	404			572	561	567						
463	405			593	590							
440	406			574	560	563						
521	409			609	607							
530	410			620	617							
535	411			628	619							
546	420			647	629							
560	430			654	638							
2750	431	FMT		677	676							
622	432			703	734							
647	435			718	654							
676	450			735	628	649	696	697	713	719	732	733
717	460			751	740							

STATEMENT LABELS			DEF LINE	REFERENCES							
734	478		759	746							
745	488		783	747							
3027	485	FMT	789	787							
1003	498		812	792							
3067	499	FMT	825	824							
1018	500		815	811	812						
0	501	INACTIVE	828	827							
1024	502		831	828	829						
1027	503		834	830							
1033	505		835	827							
1041	506		839	835	837						
1043	507		841	838							
1046	509		842	834	841						
1072	510		863	846							
1112	540		876	834	841	862					
1121	550		885	827	833	834	840	841			
1225	551		958	953							
1227	552		960	951	956						
1146	555		915	911							
1301	556		988	928							
1335	558		1008	982							
1364	559		1027	919	927						
1155	560		916	914							
1352	561		1032	1039							
1363	562		1036	1031							
1367	563		1040	1037							
1377	564		1046	1042							
1401	566		1047	1045							
1407	568		1051	1035	1036						
1424	570		1067	1105							
1457	580		1082	1056							
1465	585		1091	1086							
1472	586		1095	1090							
1477	587		1097	1091							
1511	590		1106	1082							
0	596	INACTIVE	1113								
1534	600		1121	1106							
1565	605		1148	1141							
1612	610		1163	1101	1120	1121					
0	620	INACTIVE	1173	1172							
1634	630		1175	1172							
1640	640		1177	1171							
0	650		1186	1183	1185						
1662	660		1189	1185	1194	1207	1208	1209	1210		
1664	670		1191	1185							
0	680		1197	1192	1196						
1702	690		1201	1196							
0	700	INACTIVE	1207	1206							
1727	710		1208	1206							
0	720	INACTIVE	1209	1208							
0	730	INACTIVE	1210	1209							
1735	740		1211	1206							
3325	745	FMT	1216	1215							
1740	770		1221	1163	1172	1174	1176	1188	1190	1196	1199	2*1207
				1208	1209	2*1210					
2026	800		1260	754							
2031	801		1265	1055							

STATEMENT LABELS			DEF LINE	REFERENCES						
2834	882		1271	1078						
2837	883		1276	1162	1223					
2842	884		1281	1178	1222					
2846	885		1287	1224						
2851	886		1293	1225						
2857	848		1308	303	486	1282				
3366	881	FMT	1262	1261						
3408	882	FMT	1267	1266						
3413	883	FMT	1273	1272						
3424	884	FMT	1278	1277						
3435	885	FMT	1284	1283						
3445	886	FMT	1289	1288						
3460	887	FMT	1295	1294						
3473	895	FMT	1301	1300						
2053	908		1298	1217	1263	1269	1274	1279	1285	1291	1296
0	928		1329	1314						
0	930		1330	1310						
0	932	INACTIVE	1341							
0	935		1348	1341						
2134	937		1350	1340						
2136	948		1360	198	1338					
3523	1008	FMT	1382	694	738	858	872			
3532	1002	FMT	1383	416						
3537	1004	FMT	1384	806						
3547	1005	FMT	1386	768	886	1234				
3043	1018	FMT	805	803						
3141	1028	FMT	935	934						
3152	1058	FMT	998	989						
2712	4098	FMT	612	610						

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
35		* IU	177 177	108		EXT REFS	
64	948	* I	198 1360	2858		EXT REFS	NOT INNER
124	228	* KK	262 278	348		EXT REFS	NOT INNER
133	218	* NA	267 277	238		EXT REFS	
172	258	* KK	291 293	58		EXT REFS	
208	257	* KK	299 302	78		EXT REFS	
245	109	II	420 421	28	INSTACK		
278	349	LDEPTH	448 458	38	INSTACK		
417	401	IND	558 559	28	INSTACK		
536	458	* NBD	628 735	1438		EXT REFS	
1021	582	* LDEPTH	828 831	48	INSTACK	EXITS	
1036	586	* KD	835 839	48	INSTACK	EXITS	
1654	658	* JSEC	1183 1186	48	INSTACK	EXITS	
1664	688	* JSEC	1192 1197	148		EXT REFS	EXITS
2063	938	* KK	1318 1330	328		EXT REFS	NOT INNER
2067	928	* II	1314 1329	238		EXT REFS	
2127	935	* LOOP	1341 1348	58		EXT REFS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
/ /	1105	0 KLKL (400)	400 KK (1)	401 KL (80)			
		481 INFILE (1)	482 DB150 (1)	483 NOPRNT (5)			
		488 NOPTS (5)	493 OUTAPE (1)	494 INDISC (5)			
		499 FREQR (300)	799 LINELT (1)	800 NOEPS (1)			
		801 TOPT (50)	851 ENDX (1)	852 IANG (160)			
		1012 IFXHP (80)	1092 JOISC (5)	1097 JPRNT (1)			
		1098 KPRNT (1)	1099 BEGINX (1)	1100 NO (1)			

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
		1101	INTAPF	(1)	1102	NRAYP	(1)	1103	JBEGNP	(1)
		1104	IBEGNP	(1)						
OLDARY	400	0	KLK2	(400)						
QUANTS	1617	0	AR	(202)	202	BB	(202)	404	CC	(202)
		606	AC	(202)	808	AC	(202)	1010	ALPHR	(202)
		1212	GRAD	(202)	1414	YBDRY	(203)			
XRANGE	1	0	XBDRY	(1)						
HORIZO	1	0	NHOR7	(1)						
EXTRAN	1	0	NP	(1)						
FORGOT	1	0	NUMSEC	(1)						
CFILL	7	0	PROFILE	(1)	1	SPCFILE	(1)	2	CONFILE	(1)
		3	OANFILE	(1)	4	NUMPRO	(1)	5	NUMCON	(1)
		6	NUMOAN	(1)						
ABREAK	81	0	NBRK	(1)	1	ANGBRK	(80)			
RAYS	321	0	NANGLE	(1)	1	THEO	(160)	161	IFXH	(160)
PLTIN	5	0	ANGMAX	(1)	1	ANGMIN	(1)	2	NX	(1)
		3	NY	(1)	4	NI	(1)			
PLTINF	34	0	IFMIC	(1)	1	NRTCAL	(1)	2	NPLOT	(1)
		3	RPLOT	(31)						
DEPTHS	2	0	REGINV	(1)	1	IOPTN	(1)			
SCALEF	6	0	NTLPLT	(1)	1	DRPLT	(1)	2	TLMIN	(1)
		3	TLMAX	(1)	4	NRX	(1)	5	NOBY	(1)
BOTREF	14	0	X0	(1)	1	Y0	(1)	2	X1	(1)
		3	Y1	(1)	4	C0	(1)	5	THETA0	(1)
		6	C1	(1)	7	T1	(1)	8	DT	(1)
		9	PSI	(1)	10	SINPB	(1)	11	RAD	(1)
		12	AL	(1)	13	BL	(1)			
BOTTOM	249	0	DEP	(62)	62	RANGF	(62)	124	ABOT	(62)
		186	BBOT	(62)	248	NBP	(1)			
BBB	25	0	YDEP	(5)	5	RTCAL	(20)			
FINPUT	37	0	FSAVE	(30)	30	NFREQ	(1)	31	NF	(1)
		32	IIBOT	(1)	33	KBOT	(1)	34	NKBOT	(1)
		35	IPTR	(1)	36	KPTR	(1)			

EQUIV CLASSES		LENGTH	MEMBERS - BIAS NAME(LENGTH)								
	IARY	6	0	INDIC	(6)	1	IHOR7	(1)	2	ISURF	(1)
			3	IBOT	(1)	4	IBD	(1)	5	JLINE	(1)
	ARYREC	7	0	IARYRC	(7)	0	KEYNEW	(1)			
	ARYRE2	7	0	IARYR2	(7)	0	KEYOLD	(1)			
KLKL	INTAPE	1	0	ITON	(1)						

STATISTICS

PROGRAM LENGTH	15137B	6751
CM LABELED COMMON LENGTH	5362B	2802
CM BLANK COMMON LENGTH	2121B	1105

```
      SUBROUTINE CTL3                                                   CTL3     2
      COMMON/PARM/ICFLG                                                 CTL3     3
C                                                                       CTL3     4
C                                                                       CTL3     5
C       REMOVE DREQP FROM BLANK COMMON.IT USED TO BE FREQP BUT IT WAS   CTL3     6
C     CHANGED WHEN IT WAS NOTED THAT IT IS ONLY USED HERE.              CTL3     7
C                                                                       CTL3     8
C                                                                       CTL3     9
C                                                                       CTL3    10
      COMMON KLKL(5,80),KK,KL(80)                                       CTL3    11
     *     ,INFILE,DALSG,NOPRNT(6),NOPTS(6),OUTAPE,INDTSC(5),          CTL3    12
     *     DREQP(6,10,5),LINFLT,NDEPS,IOPT1(5,5),ENDX,TANG(150),       CTL3    13
     *     IFXMP(80),IDISC(5),JPRNT,KPRNT,BEGINX,MC,INTAPE,NPAYP,      CTL3    14
     *    JREGNP,IREGNP                                                CTL3    15
      COMMON /DALOSS/ DAR(3009)                                         CTL3    16
      COMMON/LOSSA/SUBDEP,NOTUSE(10)                                    CTL3    17
      COMMON/ESM345/NTPMIC,IFAMD                                        CTL3    18
      COMMON/PLTAPE/MTGTAP                                              CTL3    19
      COMMON/LOSSB/NPTL,PTL1,DRTL,FREQ,TSIT,IFCOH,IFM                   CTL3    20
      COMMON /ARREAK/ NARK,ANGARK(80)                                   CTL3    21
      COMMON/Y/IPC,IPUNCH                                               CTL3    22
      COMMON/RAYS/NANGLE,TMED(160),IFXM(160)                            CTL3    23
      COMMON /PLTINF/ IFMIC,NRTCAL,NPLOT,PPLOT(31)                      CTL3    24
      COMMON/X/IDISC                                                    CTL3    25
      COMMON /DEPTHS/ BEGINY,IOPTN                                      CTL3    26
      COMMON/TITLES/TITLE(8)                                            CTL3    27
      COMMON/BOB/YDEP(5),RTCAL(20)                                      CTL3    28
      COMMON/CCC/JTEST                                                  CTL3    29
      COMMON/CFILL/PROFILE,SPCFILE,CONFILE,DANFILE,NUMPRO,NUMCON,NUMDAN CTL3    30
       COMMON/ BUGS    /DEBUG                                           15NOV77 17
      COMMON /FINPUT/ FSAVE(30),NFREQ,IF,IROT,KROT,NKROT,IPTR,KPTR      CTL3    33
C                                                                       CTL3    34
C                                                                       CTL3    35
C       NUMFRQ(I)=THE NUM. OF FREQS AT YDEPTH(I).                       CTL3    36
C                                                                       CTL3    37
C                                                                       CTL3    38
      DIMENSION NUMFRQ(5)                                               CTL3    39
      DIMENSION FREQS(6,5)                                              CTL3    40
      DIMENSION ROTLOS(30)                                              CTL3    41
      DIMENSION TSIA(5),IFCA(5)                                         CTL3    42
       DIMENSION IRDATC(521),ROTIDC(249)                                16MAR79 12
       COMMON/ IRDATA /NROTF,NROTF(13),THETA(25,13),BL(25,10),NPTSRF(10) RTLOS   2
C       COMMON IRDATA CONTAINS BOTTOM LOSS FUNCTION INFORMATION GEN-     RTLOS   3
C       ERATED BY MP-PART1                                              RTLOS   4
C                                                                       RTLOS   5
      EQUIVALENCE (IRDATC(1),NROTF)                                     CTL3    45
C                                                                       CTL3    46
      EQUIVALENCE (ITON, INTAPE)                                        CTL3    47
      COMMON/SCALEF/NPLOTS,DPPLOT,DRMIN,DRMAX,NGY,NGY                   CTL3    48
      COMMON/CUTTOM/DEL(62),RANGE(62),AROT(62),BROT(62),NRP             CTL3    49
      COMMON /PLTIN/ ANG1,ANG2,NY,NY,NT                                 CTL3    50
      DIMENSION LOSSAC(11),ARREAC(81),RAYSC(721),DRPC(25)               CTL3    51
     1  ,BLANKC(1150),FINPUC(32),DEPTHC(2),YC(2)                       CTL3    52
      EQUIVALENCE  (LOSSAC(1),SUBDEP),                                  CTL3    53
     &    (ROTIDC(1),DEP(1)),                                          CTL3    54
     1  (ARREAC(1),NARK),(RAYSC(1),NANGLE),(DRPC(1),YDEP(1))           CTL3    55
     2  ,(BLANKC(1),KLKL(1,1)),(FINPUC(1),FSAVE(1)),(DEPTHC(1),BEGINY),C CTL3    56
```

```
                      VC(1),TPC)                                                CTL3       57
                    INTEGER OUTAPE                                              CTL3       58
                    INTEGER COMTAP                                              CTL3       59
                     LOGICAL DEBUG                                              15*OW77    1A
                    DATA COMTAP/27/                                             CTL3       60
                    DATA RNEG/-1.0/                                             CTL3       61
                C                                                               CTL3       62
                C                                                               CTL3       63
                C                                                               CTL3       64
                C                                                               CTL3       65
                C                                                               CTL3       66
                C                                                               CTL3       67
                      READ(43) NRTCAL,NDEPS,NTPNTC,IFAMD                        CTL3       68
                C                                                               CTL3       69
                C                                                               CTL3       70
                C           TBDATC IS NEEDED TO COMPUTE THE BOTTOM LOSS.        CTL3       71
                C                                                               CTL3       72
                C                                                               CTL3       73
                      READ(48)BOTTOC,TBDATC,DUMMIE                              CTL3       74
                C                                                               CTL3       75
                C                                                               CTL3       76
                C           IBOT IS THE FILE WHERE THE BOTTOM LOSS WILL BE WRITTEN. CTL3   77
                      IBOT=44                                                   CTL3       78
                C                                                               CTL3       79
                C                                                               CTL3       80
                C           IIBOT IS THE FILE WHERE THE NECESSARY INFO. FROM PART2 IS. CTL3 81
                      IIBOT=18                                                  CTL3       82
                      KBOT=19                                                   CTL3       83
                      NKBOT=1001                                                CTL3       84
                      IPTR=0                                                    CTL3       85
                      KPTR=0                                                    CTL3       86
                C                                                               CTL3       87
                C                                                               CTL3       88
                C           MICTAP IS THE DISK UNIT FOR INTENSITY AND THETA VS. RANGE CTL3 89
                C                PLOTS.                                         CTL3       90
                C                                                               CTL3       91
                C                                                               CTL3       92
                      MICTAP=26                                                 CTL3       93
                C  ***************************************************          CTL3       94
                C                                                               CTL3       95
                C                                                               CTL3       96
                C           READ IN TITLE.                                      CTL3       97
                C                                                               CTL3       98
                C                                                               CTL3       99
                C  ***************************************************          CTL3      100
                      READ(5,3)TITLE                                            CTL3      101
                    3 FORMAT(9A10)                                              CTL3      102
                      WRITE(6,4) TITLE                                          CTL3      103
                    4 FORMAT(1X,9A10)                                           CTL3      104
                C  ***************************************************          CTL3      105
                C                                                               CTL3      106
                C                                                               CTL3      107
                C           READ NRTL,RTL1,DRTL.                                CTL3      108
                C                                                               CTL3      109
                C                                                               CTL3      110
                C  ***************************************************          CTL3      111
                C           NRTL = NO. OF RANGES FOR COMPUTATION OF TRANSMISSION LOSS. CTL3 112
```

```
C          RTL1   = FIRST RANGE FOR TL(R) IN NAUT MILES.
C          DRTL   = RANGE INCREMENT IN NAUT MILES.
C
      READ(5,5) NRTL,RTL1,DRTL
    5 FORMAT(I5,5X,2F10.2)
      WRITE(6,7)NRTL,RTL1,DRTL
    7 FORMAT(*     NRTL  =*,I5,*,RTL1  =*,F10.2,*,DRTL  =*,F10.2)
C ********************************************************************
C
C
C          FOR EACH DEPTH READ IN IFCOH,ISIT.(FOR EXPLANATION SEE BELOW)
C
C
C ********************************************************************
      READ(5,225) (IFCA(KK),ISTA(KK),KK=1,NDEPS)
  225 FORMAT(2I5)
      WRITE(6,325)(IFCA(KK),ISTA(KK),KK=1,NDEPS)
  325 FORMAT(*       IFCOH       ISIT(*,/,(2(6XI5)))
C******************************************************
C
C          FOR EACH DEPTH READ IN FREQS. OF INTEREST.
C
C******************************************************
      JJ=1
C
C
C          FSAVE  = ARRAY OF THE DISTINCT FREQS READ IN (FSAVE(1) IS
C                A DUMMY TO GET THIS STARTED.)
C
      FSAVE(1)=0.0
      DO 90 KK=1,NDEPS
        READ(5,10)NUMERQ(KK)
   10   FORMAT(I5)
        WRITE(6,20) KK,NUMERQ(KK)
   20   FORMAT(*      NUMERQ(*,I2,*)=*,I5)
C
C
        NUM=NUMERQ(KK)
      READ(5,30) (FREQR(L,KK),L=1,NUM)
   30   FORMAT(8F10.2)
      WRITE(6,40) (FREQR(L,KK),L=1,NUM)
   40   FORMAT(*      FREQR =*,8F10.2,/,(12X,8F10.2))
        DO 80 L=1,NUM
            DO 60 J=1,JJ
            IF (FREQR(L,KK) .EQ. FSAVE(J)) GO TO 80
   60       CONTINUE
            JJ=JJ+1
          FSAVE(JJ)=FREQR(L,KK)
   80   CONTINUE
   90 CONTINUE
C
C          WO   = THE MINIMUM OF ALL THE FREQS READ IN.
      WO=FSAVE(2)
C
      IF (JJ .LE. 2) GO TO 97
      DO 95 J=3,JJ
        IF(FSAVE(J) .LT. WO) WO=FSAVE(J)
```

```
                  95   CONTINUE                                                          CTL3   170
                  97   CONTINUE                                                          CTL3   171
                C                                                                       CTL3   172
                C                                                                       CTL3   173
      175       C          NFREQ = ONE MORE THAN THE NUMBER OF DISTINCT FREQS. READ IN.  CTL3   174
                C                  RECALL-FSAVE(1) IS JUST A DUMMY TO GET THE PROCESS  CTL3   175
                C                        STARTED.                                       CTL3   176
                C                                                                       CTL3   177
                C                                                                       CTL3   178
      180       C                                                                       CTL3   179
                      NFREQ=J-1                                                         CTL3   180
                C                                                                       CTL3   181
                C                                                                       CTL3   182
                C          NF = THE TRUE NO. OF DISTINCT FREQS.                         CTL3   183
      185       C                                                                       CTL3   184
                C                                                                       CTL3   185
                      NF=NFREQ-1                                                        CTL3   186
                C                                                                       CTL3   187
                C                                                                       CTL3   188
      190       C          IF IS THE VARIABLE THAT APPEARS IN THE COMMON FINPUT.        CTL3   189
                C                                                                       CTL3   190
                C                                                                       CTL3   191
                      IF=NF                                                             CTL3   192
                C  ***************************************************************    CTL3   193
      195       C                                                                       CTL3   194
                C                                                                       CTL3   195
                C              CALCULATE THE BOTTOM LOSS.                               CTL3   196
                C                                                                       CTL3   197
                C                                                                       CTL3   198
      200       C ***********************************************************           CTL3   199
                  400  DO 400 KK=1,20                                                  CTL3   200
                         BOTLOS(KK)=0.0                                                 CTL3   201
                  400  CONTINUE                                                        CTL3   202
                C                                                                       CTL3   203
      205       C                                                                       CTL3   204
                C          THERE MUST BE ENTRIES FOR 25 BOTTOM BOUNCES.                 CTL3   205
                      DO 520 IT=1,25                                                    CTL3   206
                        READ(IR(1))XNM,PSI                                              CTL3   207
                        IF (EOF(IR(1))) 550,450                                         CTL3   208
      210       C                                                                       CTL3   209
                C                                                                       CTL3   210
                C          PNEG IS SET TO -1.0 IN A DATA STATEMENT ABOVE.PNEG IS        CTL3   211
                C        WRITTEN TO TAPE TRACE BY PART2 (RAY TRACE) AS A FILLER IF A RAY CTL3   212
                C        HAS LESS THAN 25 BOTTOM BOUNCES.                               CTL3   213
      215       C                                                                       CTL3   214
                C                                                                       CTL3   215
                  450     IF (XNM .EQ. PNEG ) GO TO 420                                 CTL3   216
                C                                                                       CTL3   217
                C                                                                       CTL3   218
      220       C          RECALL-FSAVE(1) IS A FAKE FREQ.(NAMELY,0.0)                  CTL3   219
                  490  DO 500 KK=2,NFREQ                                              CTL3   220
                         III=KK-1                                                       CTL3   221
                         BOTLOS(III)=BOTLOS(III)+FLOSS(XNM,PSI,FSAVE(KK))               CTL3   222
                  500  CONTINUE                                                        CTL3   223
      225         520  WRITE(IBOT) (BOTLOS(III),III=1,NF)                             CTL3   224
                  520  CONTINUE                                                        CTL3   225
                       GO TO 580                                                        CTL3   226
                  550  CONTINUE
```

```
                      REWIND LOOT                                                CTL3  227
                      REWIND  KROT                                               CTL3  228
230                C ***********************************************************  CTL3  229
                   C                                                             CTL3  230
                   C                                                             CTL3  231
                   C          BEGIN LOOP TO PROCESS EACH DEPTH.                  CTL3  232
                   C                                                             CTL3  233
235                C                                                             CTL3  234
                   C ***********************************************************  CTL3  235
                      DO 1080 MK    =   1,NDEPS                                  CTL3  236
                   C                                                             CTL3  237
                   C                                                             CTL3  238
240                C                                                             CTL3  239
                   C          CALL OVERLAY(3,1) USED TO BE HERE.                 CTL3  240
                      READ(62)LOSSAC,AOREAC,FAVSC,      IDISC,JTEST,BLANKC       CTL3  241
                      IF(JTEST .EQ. 0) GO TO 1080                                CTL3  242
                   C                                                             CTL3  243
245                C     ICOOH=0 NO CAUSTIC COHERENCE.                           CTL3  244
                   C                  1 CAUSTIC COHERENCE                        CTL3  245
                   C                  RELEVENT ONLY FOR IPC = 1                  CTL3  246
                   C     ISTT=0 NO DIRECTIVITY PATTERNS.                         CTL3  247
                   C          1 SURFACE IMAGE INTERFERENCE (SII) AT SOURCE.      CTL3  248
250                C          2 USER SUPPLIED VERTICAL PATTERN (SPP)             CTL3  249
                   C          3 USER SUPPLIED VERTICAL RECEIVER PATTERN (RCP)    CTL3  250
                   C          4 SII + RCP                                        CTL3  251
                   C          5 SPP + RCP                                        CTL3  252
                   C                                                             CTL3  253
255                C                                                             CTL3  254
                   C                                                             CTL3  255
                   C          NOIFAM IS THE NUMBER OF RECORDS ON THE FILE TO BE READ ON  CTL3  256
                   C                  TFAM0.                                     CTL3  257
                   C                                                             CTL3  258
260                C                                                             CTL3  259
                      NOTFAM= 0                                                  CTL3  260
                   CC                                                            CTL3  261
                   C                                                             CTL3  262
                     NF=NUMFRQ(KK)                                               CTL3  263
265                C ***********************************************************  CTL3  264
                   C                                                             CTL3  265
                   C                                                             CTL3  266
                   C          READ THE OUTPUT FROM PART4(SUBDTV+CAUST).          CTL3  267
                   C                                                             CTL3  268
270                C                                                             CTL3  269
                   C ***********************************************************  CTL3  270
                      READ(63) LOSSAC,DEPTHC,VC,BLANKC                           CTL3  271
                      ICOOH=ICCA(KK)                                             CTL3  272
                      ISTT=ICTA(KK)                                              CTL3  273
275                C                                                             CTL3  274
                   C                                                             CTL3  275
                   C                                                             CTL3  276
                   C          WRITE A HEADER  RECORD TO FILE COMTAP CONSISTING OF THOSE  CTL3  277
280                C     VARIABLES THAT ARE INDEPENDENT OF DEPTH AND FREQ. WE DO IT HERE  CTL3  278
                   C     INSTEAD OF OUTSIDE THE MDEPS LOOP SINCE BEGINX HAS NOT  CTL3  279
                   C     AVAILABLE UNTIL NOW.                                    CTL3  280
                   C                                                             CTL3  281
                   C                                                             CTL3  282
285                C       IF (KK .EQ. 1) WRITE(COMTAP) MJCTAP,NRTL,RTL1,DRTL,BEGINX,  CTL3  283
```

```
     1                    DEP,RANGE,NRP                                CTL3      286
C                                                                      CTL3      285
C                                                                      CTL3      286
C                                                                      CTL3      287
C                                                                      CTL3      288
C          NOW WRITE A RECORD OF DEPTH DEPENDENT VARIABLES.            CTL3      289
C                                                                      CTL3      290
C                                                                      CTL3      291
        WRITE(COMTAP) NF,SURDEP,IPC,IFCOH,ISII                         CTL3      292
        DO 1290 L=1,NF                                                 CTL3      293
          FREQ=FREQR(L,KK)                                             CTL3      294
      IF (NOIFAM .EQ. 0) GO TO 200                                     CTL3      295
C                                                                      CTL3      296
C                                                                      CTL3      297
C          THIS FILE HAS BEEN READ WITHIN THIS LOOP. BACKSPACE         CTL3      298
C       NOIFAM+1 RECORDS(1 FOR THE EOF).                               CTL3      299
C                                                                      CTL3      300
C                                                                      CTL3      301
      NOIFAM=NOIFAM+1                                                  CTL3      302
      DO 100 KJ=1,NOIFAM                                               CTL3      303
        BACKSPACE IFAMD                                                CTL3      304
  100 CONTINUE                                                         CTL3      305
      NOIFAM=0                                                         CTL3      306
  200 CONTINUE                                                         CTL3      307
      CALL CTL34(NOIFAM)                                               CTL3      308
C     WRITE A COMMON FILE MICRO RECORD                                 CTL3      309
C                                                                      CTL3      310
C                                                                      CTL3      311
C          WRITE A RECORD OF FREQ. DEPENDENT VARIABLES TO COMTAP.      CTL3      312
C                                                                      CTL3      313
C                                                                      CTL3      314
         WRITE(COMTAP) FREQ,DBB                                        CTL3      315
C                                                                      17JAN75     4
C                                                                      17JAN75     5
C          FILE 23 IS CREATED FOR J. HANNA'S SPECIAL PLOT PROGRAM.     17JAN75     6
C                                                                      17JAN75     7
C                                                                      17JAN75     8
      INF=1                                                            17JAN75     9
        CALL DATE(IDATE)                                               17JAN75    10
      WRITE(23) TITLE,IDATE,BEGINY,SURDEP,NRTL,INF,FREQ                17JAN75    11
      RAN=RTL1                                                         17JAN75    12
      DO 1100 M=1,NRTL                                                 17JAN75    13
        WRITE(23)RAN,DBB(M)                                            17JAN75    14
        RAN=RAN+DELTL                                                  17JAN75    15
 1100 CONTINUE                                                         17JAN75    16
      END FILE 23                                                      17JAN75    17
C                                                                      17JAN75    18
C                                                                      17JAN75    19
C                                                                      17JAN75    20
C                                                                      CTL3      316
C                                                                      CTL3      317
C     WRITE A FLAG RECORD ON THE MICTAP FILE TO                        CTL3      318
C     SIGNAL A CHANGE OF FREQUENCY, DEPTH, OR OPTION.                  CTL3      319
C                                                                      CTL3      320
C                                                                      CTL3      321
      IDUM = 999999                                                    CTL3      322
      NPTS=1                                                           CTL3      323
```

```
                      WRITE(MICTAP) IDUM,NPTS,THEO(1),THEO(1),THEO(1)                    CTL3   324
                                                                                         CTL3   325
                C                                                                        CTL3   326
      345       C                                                                        CTL3   327
                 1290 CONTINUE                                                           CTL3   328
                C                                                                        CTL3   329
                C         END LOOP ON FREQUENCIES                                        CTL3   330
                C                                                                        CTL3   331
      350       C                                                                        CTL3   332
                C                                                                        CTL3   333
                 1080 CONTINUE                                                           CTL3   334
                C                                                                        CTL3   335
                C         END LOOP ON SOURCE DEPTHS                                      CTL3   336
      355       C                                                                        CTL3   337
                      END
```

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
129	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
131	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
145	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
201	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
221	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
239	I		CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
1 CTL3 1 356

VARIABLES	SN	TYPE	RELOCATION								
174	ABOT	REAL	ARRAY	BOTTOM	REFS	50					
0	ABREAC	REAL	ARRAY	ABREAK	REFS	52	54	DEFINED	242		
1	ANGBRK	REAL	ARRAY	ABREAK	REFS	20					
0	ANG1	REAL		PITTN	REFS	51					
1	ANG2	REAL		PITTN	REFS	51					
0	BRRC	REAL	ARRAY	BRR	REFS	52	54				
272	BBOT	REAL	ARRAY	BOTTOM	REFS	50					
2113	BEGINX	REAL		/ /	REFS	10					
0	BEGINY	REAL		DEPTHS	REFS	25	54	285	325		
405	BL	REAL	ARRAY	TRDATA	REFS	42					
3	BLANKC	REAL	ARRAY	/ /	REFS	52	54	DEFINED	242	273	
700	BOTLOS	REAL	ARRAY		REFS	39	223	225	DEFINED	202	223
0	BOTTOC	REAL	ARRAY	BOTTOM	REFS	41	54	DEFINED	76		
333	COMTAB	INTEGER			REFS	60	DEFINED	62	I/O REFS	285	296	317
2	CONFILE	REAL		DETLL	REFS	29					
0	DBR	REAL	ARRAY	DBLOSS	REFS	15	317	329			
1	DBRAY	REAL		SCALEF	REFS	44					
2	DBMIN	REAL		SCALEF	REFS	49					
742	DBTOC	REAL		/ /	REFS	10					
0	DEBUG	LOGICAL		DIGS	REFS	33	61				

VARIABLES	SN	TYPE	RELOCATION							
3		DEP	REAL	ARRAY	BOTTOM	REFS	53	54	285	
0		DEPTHC	REAL	ARRAY	DEPTHS	REFS	52	54	DEFINED	273
763		DREDP	REAL	ARRAY	/ /	REFS	13			
1		DRPLOT	REAL		SCALEF	REFS	49			
2		DRTL	REAL		LOSSR	REFS	19	120	285	329
612		DUMMIE	* REAL			DEFINED	76			
1523		ENDX	REAL		/ /	REFS	13			
5		FINPUT	REAL	ARRAY	FINPUT	REFS	52	54		
3		FRED	REAL		LOSSR	REFS	19	317	325	DEFINED
642		FREDP	REAL	ARRAY		REFS	39	155	159	162
						DEFINED	153			
0		FSAVE	REAL	ARRAY	FINPUT	REFS	31	54	159	167
						DEFINED	144	162		
1524		IANG	INTEGER	ARRAY	/ /	REFS	13			
2120		IBEGNP	INTEGER		/ /	REFS	13			
40		IBOT	INTEGER		FINPUT	REFS	31	DEFINED	80	I/O REFS
0		ICFLG	INTEGER		PARM	REFS	2			
630		IDATE	INTEGER			REFS	324	325		
0		IDISC	INTEGER		X	REFS	24	DEFINED	242	
633		IDUM	INTEGER			REFS	343	DEFINED	341	
37		IF	INTEGER		FINPUT	REFS	31	DEFINED	193	
1		IFAMD	INTEGER		FPM345	REFS	17	DEFINED	70	I/O REFS
743		IFCA	INTEGER	ARRAY		REFS	40	131	274	DEFINED
5		IFCOM	INTEGER		LOSSR	REFS	19	296	DEFINED	274
6		IFM	INTEGER		LOSSR	REFS	19			
8		IFMIC	INTEGER		PLTINF	REFS	23			
241		IFXM	INTEGER	ARRAY	RAYS	REFS	22			
1764		IFXMP	INTEGER	ARRAY	/ /	REFS	10			
621		II	* INTEGER			DEFINED	207			
613		IIBOT	INTEGER			REFS	209	DEFINED	84	I/O REFS
624		III	INTEGER			REFS	2*223	225	DEFINED	222
756		INDISC	INTEGER	ARRAY	/ /	REFS	13			
627		INF	INTEGER			REFS	325	DEFINED	323	
741		INFILE	INTEGER		/ /	REFS	13			
2115		INTAPE	INTEGER		/ /	REFS	10	68		
1441		IOBT	INTEGER	ARRAY	/ /	REFS	13			
1		IOPTN	INTEGER		DEPTHS	REFS	25			
0		IPC	INTEGER		Y	REFS	21	54	296	
43		IPIP	INTEGER		FINPUT	REFS	31	DEFINED	87	
1		IPUNCH	INTEGER		Y	REFS	21			
736		ISIB	INTEGER	ARRAY		REFS	40	131	275	DEFINED
4		ISIT	INTEGER		LOSSR	REFS	19	296	DEFINED	275
2115		ITON	INTEGER		/ /	REFS	49			
617		J	INTEGER			REFS	159	DEFINED	158	170
2117		JBEGNP	INTEGER		/ /	REFS	13			
2104		JBISC	INTEGER	ARRAY	/ /	REFS	13			
614		JJ	INTEGER			REFS	159	161	162	169
						DEFINED	139	151		
2111		JPRNT	INTEGER		/ /	REFS	10			
0		JTEST	INTEGER		CCC	REFS	29	243	DEFINED	242
41		KBOT	INTEGER		FINPUT	REFS	31	DEFINED	85	I/O REFS
625		KJ	* INTEGER			DEFINED	305			
620		KK	INTEGER		/ /	REFS	13	2*129	2*131	146
							155	159	162	202
							275	285	296	DEFINED
							221	233		
621		KL	INTEGER	ARRAY	/ /	REFS	13			

VARIABLES	SN	TYPE		SELECTATION								
0	KLKL	INTEGER	ARRAY	/ /	REFS	10	54					
2112	KPONT	INTEGER		/ /	REFS	10						
44	KPTP	INTEGER		FINPUT	REFS	31	DEFINED	88				
615	L	INTEGER			REFS	153	155	159	162	296		
					DEFINED	153	155	157	295			
1437	LTAELT	INTEGER		/ /	REFS	10						
0	LOSSAC	INTEGER	ARRAY	LOSSA	REFS	52	54	DEFINED	242	273		
632	M	INTEGER			REFS	329	DEFINED	327				
0	MICTAP	INTEGER		PLTAPE	REFS	18	285	DEFINED	95	170 REFS	343	
0	NANGLE	INTEGER		RAYS	REFS	22	54					
0	NBOTE	INTEGER		TRDATA	REFS	42	46					
320	NBP	INTEGER		BOTTOM	REFS	50	285					
0	NBRK	INTEGER		BRPEAK	REFS	20	54					
1443	NDEPS	INTEGER		/ /	REFS	10	129	131	145	238		
					DEFINED	70						
620	NF	INTEGER			REFS	193	225	294	295	DEFINED	187	265
36	NFREQ	INTEGER		FINPUT	REFS	31	187	221	DEFINED	181		
6	NGY	INTEGER		SCALEF	REFS	49						
5	NGY	INTEGER		SCALEF	REFS	49						
4	NI	INTEGER		PLTIN	REFS	51						
42	NKBOT	INTEGER		FINPUT	REFS	31	DEFINED	86				
625	NOTBAM	INTEGER			REFS	297	304	305	310	DEFINED	262	304
					308							
743	NOPRNT	INTEGER	ARRAY	/ /	REFS	10						
750	NOPTS	INTEGER	ARRAY	/ /	REFS	10						
1	NOTUSE	INTEGER	ARRAY	LOSSA	REFS	16						
2	NPLOT	INTEGER		PLTINF	REFS	23						
0	NPLOTS	INTEGER		SCALEF	REFS	49						
634	NPTS	INTEGER			REFS	343	DEFINED	342				
777	NPTSRF	INTEGER	ARRAY	TRDATA	REFS	42						
2115	NRAYP	INTEGER		/ /	REFS	10						
1	NRTCAL	INTEGER		PLTINF	REFS	23	DEFINED	70				
0	NRTL	INTEGER		LOSSF	REFS	13	120	285	325	327		
					DEFINED	118						
0	NTPMIC	INTEGER		FPM345	REFS	17	DEFINED	79				
615	NUM	INTEGER			REFS	153	155	157	DEFINED	152		
5	NUMCON	INTEGER		CFILL	REFS	29						
635	NUMERG	INTEGER	ARRAY		REFS	37	148	152	265	DEFINED	146	
6	NUMPRO	INTEGER		CFILL	REFS	29						
6	NUMRAN	INTEGER		CFILL	REFS	29						
2	NX	INTEGER		PLTIN	REFS	51						
3	NY	INTEGER		PLTIN	REFS	51						
755	OUTAPE	INTEGER		/ /	REFS	10	59					
0	PROFILE	REAL		CFILL	REFS	29						
623	PST	REAL			REFS	223	DEFINED	208				
3	RANFILE	REAL		CFILL	REFS	29						
631	RAN	REAL			REFS	329	329	DEFINED	326	329		
76	RANGE	REAL	ARRAY	BOTTOM	REFS	50	285					
0	RAYSC	REAL	ARRAY	RAYS	REFS	52	54	DEFINED	242			
1	RBOTE	REAL	ARRAY	TRDATA	REFS	42						
334	RNEG	REAL			REFS	217	DEFINED	63				
3	RPLOT	REAL	ARRAY	PLTINF	REFS	23						
5	RTCAL	REAL	ARRAY	RAN	REFS	27						
1	RTL1	REAL		LOSSR	REFS	13	120	285	326	DEFINED	118	
1	SPCFILE	REAL		CFILL	REFS	29						
0	SURDEP	REAL		LOSSA	REFS	16	54	294	325			
0	TRDATC	REAL	ARRAY	TRDATA	REFS	41	46	DEFINED	76			

VARIABLES	SN	TYPE	RELOCATION							
1	INFO	REAL	ARRAY	ARYS	REFS	22	33363			
13	THETA	REAL	ARRAY	TRDATA	REFS	42				
0	TITLE	REAL	ARRAY	TITLES	REFS	24	105	325	DEFINED	103
2114	WO	REAL		/ /	REFS	13	171	DEFINED	167	171
622	XNM	REAL			REFS	217	224	DEFINED	204	
0	YC	REAL	ARRAY	Y	REFS	52	56	DEFINED	223	
0	YDEP	REAL	ARRAY	DDD	REFS	27	56			

FILE NAMES	MODE					
TAPE23	UNFMT	WRITES	325	328	MOTION	331
TAPE40	UNFMT	READS	76			
TAPE42	UNFMT	READS	242			
TAPE43	UNFMT	READS	70	223		
TAPE5	FMT	READS	103	114	120	146	153
TAPE6	FMT	WRITES	105	123	131	148	155

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
CTL34		1	310
DATE		1	324
EOF	REAL	1	200
FLOSS	REAL	3	223

STATEMENT LABELS			DEF LINE	REFERENCES	
357	3	FMT	104	103	
365	4	FMT	106	105	
376	5	FMT	119	118	
407	7	FMT	121	120	
451	10	FMT	147	146	
460	20	FMT	149	148	
471	30	FMT	154	153	
477	40	FMT	156	155	
0	60		160	158	
127	80		163	157	159
0	90		164	145	
0	95		172	170	
145	97		173	159	
0	100		307	305	
251	200		309	297	
426	225	FMT	130	129	
437	325	FMT	132	131	
153	380		201	227	
0	400		203	201	
203	423		225	217	
0	450	INACTIVE	217	220	
0	490	INACTIVE	221		
0	500		224	221	
0	520		226	207	
214	550		228	209	
313	1000		462	238	243
0	1100		330	327	
0	1240		346	295	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
11		* KK	129 129	103	EXT REFS	
67		* KK	131 131	103	EXT REFS	
57	90	* KK	145 146	463	EXT REFS	NOT INNER

LOOPS	LABEL		INDEX	FROM-TO	LENGTH	PROPERTIES
121	80	*	L	157 153	70	NOT INNER
127	60	*	J	158 160	20	INSTACK EXITS
142	95		J	170 172	30	INSTACK
154	400		KK	201 203	40	INSTACK
161	520	*	II	207 226	300	EXT REFS EXITS NOT INNER
171	500	*	KK	221 224	120	EXT REFS
220	1080	*	KK	238 352	760	EXT REFS NOT INNER
244	1230	*	L	295 346	470	EXT REFS NOT INNER
253	100	*	K,I	305 307	50	EXT REFS
274	1150	*	M	327 330	110	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - ITEM NAME(LENGTH)					
PARM	1	0 TCELG (1)					
/ /	1105	0 KLKL (400)	400 KK (1)	401 KL (80)			
		481 TNFILE (1)	482 OP150 (1)	483 NOPRNT (5)			
		488 NOPTS (5)	493 OUTAPE (1)	494 INDTSC (5)			
		499 OREOP (300)	799 LINELT (1)	800 NOEPS (1)			
		801 TOPT (50)	851 ENDX (1)	852 IANG (160)			
		1012 IEXHP (80)	1092 JDTSC (5)	1097 JPRNT (1)			
		1098 KPRNT (1)	1099 BEGINX (1)	1100 MO (1)			
		1101 TNTAPE (1)	1102 NRAYP (1)	1103 JREGNP (1)			
		1104 TREGNP (1)					
ORLOSS	3000	0 ORR (3000)					
LOSSA	11	0 SUBDEP (1)	1 NOTUSE (10)				
FRM345	2	0 NIPMIC (1)	1 IFAMO (1)				
PLTAPE	1	0 MICTAP (1)					
LOSSB	2	0 IPTL (1)	1 PTL1 (1)	2 DPTL (1)			
		3 FREQ (1)	4 ISTT (1)	5 IECOM (1)			
		6 TEM (1)					
ARREAK	81	0 MARK (1)	1 ANGPK (80)				
V	2	0 TPC (1)	1 IPUNCH (1)				
PAYS	321	0 NANGLE (1)	1 THED (160)	161 IEXH (160)			
PLTINF	36	0 IFMTC (1)	1 NPTCAL (1)	2 NPLOT (1)			
		3 PPLOT (31)					
X	1	0 IDISC (1)					
DEPTHS	2	0 BEGINY (1)	1 IOPIN (1)				
TITLES	8	0 TITLE (8)					
DAR	25	0 YDEP (5)	5 RTCBL (20)				
CCC	1	0 JTEST (1)					
CFILL	7	0 PROFILE (1)	1 SPCFILE (1)	2 CONFILE (1)			
		3 DANFILE (1)	4 NUMPRO (1)	5 NUMCON (1)			
		6 NUMDAN (1)					
BUGS	1	0 DEBUG (1)					
FINPUT	37	0 FSAVE (30)	30 NFREQ (1)	31 IF (1)			
		32 IROT (1)	33 KBOT (1)	34 NKBOT (1)			
		35 IPTR (1)	36 KPTR (1)				
TRDATA	521	0 NBOTE (1)	1 PHOTE (10)	11 THETA (250)			
		261 RL (250)	511 NDTSRF (10)				
SCALEF	6	0 NPLOTS (1)	1 DPPLOT (1)	2 DRMIN (1)			
		3 DRMAX (1)	4 NGY (1)	5 NGY (1)			
BOTTOM	249	0 DEP (62)	62 RANGE (62)	124 ABOT (62)			
		186 ROOT (62)	248 NDP (1)				
PLTIN	5	0 ANG1 (1)	1 AUG2 (1)	2 NX (1)			
		3 NY (1)	4 NI (1)				

EQUIV	CLASSES	LENGTH	MEMBERS - CLAS NAME(LENGTH)		
KLKL	KLKL	1105	0 BLANKC (1105)	1121 INTAPE (1)	1131 TTON (1)
SUMDEP	SUMDEP	11	0 LOSSAC (11)		
NAPK	NAPK	81	0 APPEAC (81)		
IPC	IPC	2	0 YC (2)		
NANGLE	NANGLE	321	0 PAYSC (321)		
REGIAY	REGIAY	2	0 DEPTHC (2)		
YDEP	YDEP	25	0 BBHC (25)		
ESAVE	ESAVE	37	0 ETNPUC (37)		
NROTE	NROTE	521	0 TRNATC (521)		
DEP	DEP	249	0 PDTIDC (249)		

STATISTICS

PROGRAM LENGTH	7508	488
CM LABELED COMMON LENGTH	103418	4323
CM BLANK COMMON LENGTH	21218	1105

```
SUBROUTINE GETARV     74/74   OPT=2                    FTN 4.6+452      18/08/78  10.51.31      PAGE     1

      1                SUBROUTINE GETARV                                          15AUG78   99
                C                                                                 15AUG78  100
                C                                                                 15AUG78  101
                C       THIS ROUTINE GETS THE NEXT RANDOM ARRIVAL RECORD IF IT IS 15AUG78  102
      5         C       NOT ALREADY IN THE BUFFER FROM THE PREVIOUS GET.          15AUG78  103
                C                                                                 15AUG78  104
                      COMMON /ARVDA/ ARVFIT(35), ARVREC(7), ARVKEY(3), NGET, KEYSAV 15AUG78  105
                C                                                                 15AUG78  106
                      INTEGER ARVFIT, ARVKEY                                      15AUG78  107
     10         C                                                                 15AUG78  108
                      EQUIVALENCE (IARVK, ARVREC(1))                              15AUG78  109
                C                                                                 15AUG78  110
                      IARVK = ARVKEY(1) * 10000 + ARVKEY(2) * 1000 + ARVKEY(3)    15AUG78  111
                      IF(IARVK .EQ. KEYSAV) RETURN                                15AUG78  112
     15         C                                                                 15AUG78  113
                      KEYSAV = IARVK                                              15AUG78  114
                      CALL GET(ARVFIT,ARVREC,IARVK,0)                             15AUG78  115
                      NGET = NGET + 1                                             15AUG78  116
                      RETURN                                                      15AUG78  117
     20               END                                                         15AUG78  118


      SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS     DEF LINE     REFERENCES
     1  GETARV        1        14       19

  VARIABLES     SN  TYPE          RELOCATION
     0  ARVFIT     INTEGER   ARRAY     ARVDA        REFS      7        9       17
    28  ARVKEY     INTEGER   ARRAY     ARVDA        REFS      7        9     3*13
    43  ARVREC     REAL      ARRAY     ARVDA        REFS      7       11       17
    43  IARVK      INTEGER             ARVDA        REFS     11       14       16      17   DEFINED     13
    56  KEYSAV     INTEGER             ARVDA        REFS      7       14   DEFINED     16
    55  NGET       INTEGER             ARVDA        REFS      7       18   DEFINED     18

  EXTERNALS          TYPE   ARGS      REFERENCES
       GET                    4           17

  COMMON BLOCKS   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       ARVDA        47              0 ARVFIT (35)          35 ARVREC (7)          42 ARVKEY (3)
                                   45 NGET   (1)          46 KEYSAV (1)

  EQUIV CLASSES   LENGTH     MEMBERS - BIAS NAME(LENGTH)
ARVFIT  ARVREC       7              0 IARVK  (1)

  STATISTICS
    PROGRAM LENGTH              228       18
    CM LABELED COMMON LENGTH    578       47
```

STATISTICS

60000B CM USED

```
      PROGRAM MAIN(INPUT=65,TAPE5=INPUT,OUTPUT=65,TAPE6=OUTPUT,          MAIN      2
     1    TAPE13=512,                                                   18FEB75   1
     3    TAPE41=512,                                                   18FEB75   2
     2    TAPE42=512,                                                   18FEB75   3
     4    TAPE12=512)                                                   18FEB75   4
C                                                                        15AUG78   1
C***********************************************************************15AUG78   2
C                                                                        15AUG78   3
C                          U P D A T E   I D E N T S                     15AUG78   4
C                                                                        15AUG78   5
C***********************************************************************15AUG78   6
C                                                                        15AUG78   7
C       9AUG78 - THIS IDENT CHANGES THE FILE ORGANIZATION OF THE         15AUG78   8
C                ARRIVALS FILE GENERATED IN PART2 FROM INDEXED           15AUG78   9
C                SEQUENTIAL TO DIRECT ACCESS.  THE BASIC REASON FOR      15AUG78  10
C                THIS CHANGE IS BECAUSE OF DISCONTINUANCE OF SUPPORT OF  15AUG78  11
C                SCOPE 2.3 OPERATING SYSTEM WHICH INCLUDED THE FORMER    15AUG78  12
C                ISAM FILE ORGANIZATION.                                 15AUG78  13
C                                                                        15AUG78  14
C***********************************************************************15AUG78  15
C     ***   MULTIPLE-PROFILE RAY-TRACE PROGRAM   ***                     MAIN      8
C     ***********************************************************************MAIN      9
C                                                                        MAIN     10
C                                                                        MAIN     11
C          TAPE41 IS THE DISK FILE CREATED BY PART2.                     MAIN     12
C          TAPE 42 IS THE DISK FILE CREATED BY PART3 (INTCOM).           MAIN     13
C                                                                        MAIN     14
C                                                                        MAIN     15
C ***********************************************************************MAIN     16
C     ***********************************************************************MAIN     17
      COMMON KLKL(5,80),KK,KL(80)                                        MAIN     18
     *     ,INFILE,OBISO,NOPRNT(5),NOPTS(5),OUTAPE,INDISC(5),           MAIN     19
     *     FREQR(6,10,5),LINFLT,NDEPS,IOPT(10,5),ENDX,IANG(160),        MAIN     20
     *     IFXHP(80),JDISC(5),JPRNT,KPRNT,BEGINX,WO,INTAPE,NRAYP,       MAIN     21
     *    JBEGNP,IBEGNP                                                 MAIN     22
C                                                                        MAIN     23
      COMMON/CFILL/PROFILE,SPCFILE,CONFILE,QANFILE,NUMPRO,NUMCON,NUMQAN  MAIN     24
      INTEGER QANFILE,PROFILE,CONFILE,SPCFILE                            MAIN     25
      COMMON/LOSSA/SURDEP,FREQ,ISIT,IFCOH,IFAMD,RTL1,NRTL,               MAIN     26
     1    DRTL,IFM,NTPMIC,MICTAP                                         MAIN     29
      COMMON /ARREAK/ NBRK,ANGBRK(80)                                    MAIN     30
      COMMON/RAYS/NANGLE,THEO(160),IFXH(160)                             MAIN     31
      COMMON /PLTIN/ ANGMAX,ANGMIN,NX,NY,NI                              MAIN     32
      COMMON /PLTINF/ IFMIC,NRTCAL,NPLOT,RPLOT(31)                       MAIN     33
      COMMON /DEPTHS/ BEGINY,IOPTN                                       MAIN     34
      COMMON/TITLES/TITLE(8)                                             MAIN     35
      COMMON/BBB/YDEP(5),RTCAL(20)                                       MAIN     36
      COMMON/SCALEF/NTLOLT,DPPLT,TLMIN,TLMAX,NRX,NDAY                    MAIN     37
      COMMON /FINPUT/ FSAVE(30),NFREQ,NF,IBOT,KBOT,NKBOT,IPTR,KPTR       MAIN     38
C                                                                        MAIN     39
C                                                                        MAIN     40
```

```
      C        DIMENSIONS FOR EQUIVALENCES HERE.                                MAIN      41
            DIMENSION BLANKC(105), LOSSAC(1), ARREAC(8), RAYSC(321),           15AUG78   16
           1          PLTINC(5), PLTIFC(34), DEPTHC(2),                        15AUG78   17
     55    2    SCALEC(6),RRRC(25),FINPUC(37)                                  MAIN      44
            EQUIVALENCE (INTAPE,ITON)                                          MAIN      45
            EQUIVALENCE (BLANKC(1),KLKL(1,1)), (LOSSAC(1),SURDEP),             15AUG78   18
           2(ARREAC(1),NRRK),(RAYSC(1),NANGLE),(PLTINC(1),ANGMAX),             MAIN      48
           3(PLTIFC(1),IFMIC),(DEPTHC(1),BEGINY),(SCALEC(1),NTLPLT),           MAIN      49
     60    4    (RRRC(1),YDEP(1)),                                             MAIN      50
           5(FINPUC(1),FSAVE(1))                                               MAIN      51
            COMMON/X/IDISC                                                     MAIN      52
            COMMON/CCC/JTEST                                                   MAIN      53
            INTEGER OUTAPE                                                     MAIN      54
     65     C                                                                  15AUG78   19
      C        THE FOLLOWING SPECIFICATION STATEMENTS APPLY TO THE ELEMENTS    15AUG78   20
      C        REQUIRED FOR THE ARRIVALS DIRECT ACCESS FILE FROM MPPART2.      15AUG78   21
      C                                                                        15AUG78   22
      C*************************************************************************15AUG78   23
     70     *                                                                  15AUG78   24
            COMMON /ARYDA/ ARVFIT(35), ARVREC(7), ARVKEY(3), NGET, KEYSAV      15AUG78   25
            INTEGER ARVFIT, ADVKEY                                             15AUG78   26
      C                                                                        15AUG78   27
      C*************************************************************************15AUG78   28
     75     C                                                                  15AUG78   29
            DATA QANFILE/8/,PROFILE/9/,CONFILE/10/,SPCFILE/11/,                MAIN      56
           1    NUMSPC/0/,NUMQAN/0/,NUMPRO/0/,NUMCON/0/                        MAIN      57
      C                                                                        9SEP75     1
      C                                                                        9SEP75     2
     80      REWIND 41                                                         9SEP75     3
      C                                                                        15AUG78   30
            READ(41) BLANKC,RAYSC,PLTINC,PLTIFC,DEPTHC,SCALEC,RRRC,            15AUG78   31
           1     FINPUC,LOSSAC                                                 MAIN      59
      C                                                                        MAIN      60
     85     C                                                                  MAIN      61
      C          NTPMIC = SCRATCH DISK FOR RAW SEQUENTIAL SIGNATURE GROUPS.    MAIN      62
      C              IT MAY BE SPECIFIED BY USER,SEE BELOW.                    MAIN      63
      C          IDISC  = FILE OF ARRIVALS CREATED BY PART2(RAY TRACE).        MAIN      64
      C                                                                        MAIN      65
     90     C                                                                  MAIN      66
            NTPMIC=12                                                          MAIN      67
            IDISC=13                                                           MAIN      68
      C                                                                        MAIN      69
      C                                                                        MAIN      70
     95     C ***********************************************************      MAIN      71
      C                                                                        MAIN      72
      C                                                                        MAIN      73
      C              READ NRRK,ANGRRK.                                         MAIN      74
      C                                                                        MAIN      75
     100     C                                                                 MAIN      76
      C ***********************************************************           MAIN      77
      C        NRRK  =NUMBER OF ANGLES WHERE SEQUENTIAL-SIGNATURE GROUPS       MAIN      78
```

```
C                  ARE TO BE BROKEN.                                    MAIN       79
C          ANGBRK(I),I=1,NBRK = BREAK ANGLES.                           MAIN       80
C                  SEQUENTIAL SIGNATURE GROUPS WILL BE ARTIFICIALLY     MAIN       81
C                  BROKEN AT THESE ANGLES.                              MAIN       82
      READ(5,20) NBRK                                                   MAIN       83
   20 FORMAT(I5)                                                        MAIN       84
      WRITE(6,25)NBRK                                                   MAIN       85
   25 FORMAT(1H1,*      NBRK  =*,I2)                                    MAIN       86
      IF (NBRK .LE. 0) GO TO 100                                        MAIN       87
      READ(5,35)(ANGBRK(I),I=1,NBRK)                                    MAIN       88
   35 FORMAT(8F10.2)                                                    MAIN       89
      CALL AKSORT(NBRK,ANGBRK)                                          MAIN       90
      WRITE(6,50)(ANGBRK(I),I=1,NBRK)                                   MAIN       91
   50 FORMAT(//,*       ANGBRK=*,(1H ,10F10.3))                         MAIN       92
  100 CONTINUE                                                          MAIN       93
C*****************************************************************    MAIN       94
C                                                                       MAIN       95
C                                                                       MAIN       96
C          READ NOPRNT                                                  MAIN       97
C                                                                       MAIN       98
C                                                                       MAIN       99
C ***********************************************************           MAIN      100
C                                                                       MAIN      101
C          NOPRNT = 0 SEQUENTIAL SIGNATURE GROUPS P/O                   MAIN      102
C                   1 NO SEQUENTIAL SIG. GROUPS P/O.                    MAIN      103
C                                                                       MAIN      104
      READ (5,150)(NOPRNT(KK),KK=1,NDEPS)                               MAIN      105
  150 FORMAT(16I5)                                                      MAIN      106
      WRITE(6,200)  (NOPRNT(KK),KK=1,NDEPS)                             MAIN      107
  200 FORMAT(*      NOPRNT =*,16I5,/,(12X,16I5))                        MAIN      108
C                                                                       MAIN      109
C                                                                       15AUG78    32
C ***************************************************************     15AUG78    33
C        OPEN THE ARRIVALS DIRECT ACCESS FILE FROM PART2.               15AUG78    34
C ***************************************************************     15AUG78    35
C                                                                       15AUG78    36
      CALL FILEDA(ARVFIT,3LLFN,6LGRPARV,2LFO,2LDA,2LRT,1LF,3LMRL,70,    15AUG78    37
     *            3LMNR,70,2LRB,500,3LHMB,100,2LKL,10,2LKT,1L1)         15AUG78    38
C                                                                       15AUG78    39
      CALL OPENM(ARVFIT,5LINPUT)                                        15AUG78    40
C                                                                       MAIN      117
C                                                                       MAIN      118
C                                                                       MAIN      119
C                                                                       MAIN      120
C          1.5 PROCESSING ARRIVAL INFO. FOR EACH SOURCE DEPTH.          MAIN      121
C                                                                       MAIN      122
C                                                                       MAIN      123
C          1080 LOOP COVERS ALL PROCESSING FOR Y DEPTH (KK)             MAIN      124
C                                                                       MAIN      125
C                                                                       MAIN      126
C          THE FOLLOWING REWIND USED TO BE IN INTCOM.BUT SINCE MP WAS   MAIN      127
```

```
                C      BROKEN UP IT WAS NECESSARY TO MOVE IT HERE.                    MAIN      128
     155        C                                                                     MAIN      129
                C                                                                     MAIN      130
                      REWIND NTPMIC                                                  MAIN      131
                C                                                                     MAIN      132
                C                                                                     MAIN      133
     160              DO 1080 KK=1,NDEPS                                             MAIN      134
                        CALL CTL31                                                   MAIN      135
                      WRITE(42)LOSSAC,ARREAC,RAYSC,IDISC,JTEST,BLANKC                MAIN      136
                 1080 CONTINUE                                                       MAIN      137
                C                                                                     MAIN      138
     165        C                                                                     15AUG78    41
                C ***************************************************************   15AUG78    42
                C        CLOSE THE ARRIVALS DIRECT ACCESS FILE.                       15AUG78    43
                C ***************************************************************   15AUG78    44
                C                                                                     15AUG78    45
     170              CALL CLOSEM(ARVFIT)                                            15AUG78    46
                      END                                                            MAIN      143
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

```
     129    I            CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
     131    I            CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
     160    I            CONTROL VARIABLE IN COMMON OR EQUIVALENCED, OPTIMIZATION MAY BE INHIBITED.
```


SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES

```
 4424  MAIN          1
```

VARIABLES SN TYPE RELOCATION

```
    0  ABREAC    REAL      ARRAY   ARREAK      REFS      53        57        162
    1  ANGARK    REAL      ARRAY   ARREAK      REFS      41       114        115      DEFINED      112
    0  ANGMAX    REAL              PLTIN       REFS      43        57
    1  ANGMIN    REAL              PLTIN       REFS      43
    0  ARVFIT    INTEGER   ARRAY   ARVDA       REFS      71        72        139       142         170
   52  ARVKEY    INTEGER   ARRAY   ARVDA       REFS      71        72
   43  ARVREC    REAL      ARRAY   ARVDA       REFS      71
    0  BBAC      REAL      ARRAY   BBB         REFS      53        57      DEFINED      82
 2113  BEGINX    REAL              / /         REFS      31
    0  BEGINY    REAL              DEPTHS      REFS      45        57
    0  BLANKC    REAL      ARRAY   / /         REFS      53        57        162      DEFINED       82
    2  CONFILE   INTEGER           CFILL       REFS      37        38      DEFINED      76
  742  DR150     REAL              / /         REFS      31
```

VARIABLES	SN	TYPE		RELOCATION								
0	DEPTHC	REAL	ARRAY	DEPTHS	REFS	53	57	DEFINED	82			
1	DRPLT	REAL		SCALEF	REFS	48						
7	DRTL	REAL		LOSSA	REFS	39						
1523	ENDX	REAL		/ /	REFS	31						
0	FINPUC	REAL	ARRAY	FINPUT	REFS	53	57	DEFINED	82			
1	FREQ	REAL		LOSSA	REFS	39						
743	FREQR	REAL	ARRAY	/ /	REFS	31						
0	FSAVE	REAL	ARRAY	FINPUT	REFS	49	57					
5100	I	INTEGER			REFS	112	115	DEFINED	112	115		
1524	IANG	INTEGER	ARRAY	/ /	REFS	31						
2120	IBEGNP	INTEGER		/ /	REFS	31						
40	IBOT	INTEGER		FINPUT	REFS	49						
0	IDISC	INTEGER		X	REFS	62	162	DEFINED	92			
4	IFAMD	INTEGER		LOSSA	REFS	39						
3	IFCOH	INTEGER		LOSSA	REFS	39						
10	IFM	INTEGER		LOSSA	REFS	39						
0	IFMIC	INTEGER		PLTINF	REFS	44	57					
341	IFXH	INTEGER	ARRAY	RAYS	REFS	42						
1744	IFXHP	INTEGER	ARRAY	/ /	REFS	31						
756	INDISC	INTEGER	ARRAY	/ /	REFS	31						
741	INFILE	INTEGER		/ /	REFS	31						
2115	INTAPE	INTEGER		/ /	REFS	31	56					
1441	IOPT	INTEGER	ARRAY	/ /	REFS	31						
1	IOPTN	INTEGER		DEPTHS	REFS	45						
43	IPTR	INTEGER		FINPUT	REFS	49						
2	ISII	INTEGER		LOSSA	REFS	39						
2115	ITON	INTEGER		/ /	REFS	56						
2117	JBEGNP	INTEGER		/ /	REFS	31						
2104	JDISC	INTEGER	ARRAY	/ /	REFS	31						
2111	JPRNT	INTEGER		/ /	REFS	31						
0	JTEST	INTEGER		CCC	REFS	63	162					
41	KBOT	INTEGER		FINPUT	REFS	49						
56	KEYSAV	INTEGER		ARVDA	REFS	71						
620	KK	INTEGER		/ /	REFS	31	129	131	DEFINED	129	131	160
621	KL	INTEGER	ARRAY	/ /	REFS	31						
0	KLKL	INTEGER	ARRAY	/ /	REFS	31	57					
2112	KPRNT	INTEGER		/ /	REFS	31						
44	KPTR	INTEGER		FINPUT	REFS	49						
1437	LINFLT	INTEGER		/ /	REFS	31						
0	LOSSAC	INTEGER	ARRAY	LOSSA	REFS	53	57	162	DEFINED	82		
12	MICTAP	INTEGER		LOSSA	REFS	39						
0	NANGLF	INTEGER		RAYS	REFS	42	57					
0	NBRK	INTEGER		ABREAK	REFS	41	57	109	111	112	114	115
					DEFINED	107						
5	NDBY	INTEGER		SCALEF	REFS	48						
1440	NDEPS	INTEGER		/ /	REFS	31	129	131	160			
37	NF	INTEGER		FINPUT	REFS	49						
36	NFREQ	INTEGER		FINPUT	REFS	49						
55	NGET	INTEGER		ARVDA	REFS	71						
4	NI	INTEGER		PLTIN	REFS	43						
42	NKBOT	INTEGER		FINPUT	REFS	49						

VARIABLES	SN	TYPE		RELOCATION						
743	NOPRNT	INTEGER	ARRAY	/ /	REFS	31	131	DEFINED	129	
740	NOPTS	INTEGER	ARRAY	/ /	REFS	31				
2	NPLOT	INTEGER		PLTINF	REFS	44				
2116	NRAYP	INTEGER		/ /	REFS	31				
1	NRTCAL	INTEGER		PLTINF	REFS	44				
6	NRTL	INTEGER		LOSSA	REFS	39				
6	NRX	INTEGER		SCALEF	REFS	48				
0	NTLPLT	INTEGER		SCALEF	REFS	48	57			
11	NTPMIC	INTEGER		LOSSA	REFS	39	DEFINED	91	I/O REFS	157
5	NUMCON	INTEGER		CFILL	REFS	37	DEFINED	76		
4	NUMPRO	INTEGER		CFILL	REFS	37	DEFINED	76		
6	NUMRAN	INTEGER		CFILL	REFS	37	DEFINED	76		
4742	NUMSPC *	INTEGER			DEFINED	76				
2	NX	INTEGER		PLTIN	REFS	43				
3	NY	INTEGER		PLTIN	REFS	43				
755	OUTAPE	INTEGER		/ /	REFS	31	64			
0	PLTIFC	REAL	ARRAY	PLTINF	REFS	53	57	DEFINED	82	
0	PLTINC	REAL	ARRAY	PLTIN	REFS	53	57	DEFINED	82	
0	PROFILE	INTEGER		CFILL	REFS	37	38	DEFINED	76	
3	RANFILE	INTEGER		CFILL	REFS	37	38	DEFINED	76	
0	RAYSC	REAL	ARRAY	RAYS	REFS	53	57	162	DEFINED	82
3	RPLOT	REAL	ARRAY	PLTINF	REFS	44				
5	RTCAL	REAL	ARRAY	RRR	REFS	47				
5	RTL1	REAL		LOSSA	REFS	39				
0	SCALEC	REAL	ARRAY	SCALEF	REFS	53	57	DEFINED	82	
1	SPCFILE	INTEGER		CFILL	REFS	37	38	DEFINED	76	
0	SUBDEP	REAL		LOSSA	REFS	39	57			
1	THEO	REAL	ARRAY	RAYS	REFS	42				
0	TITLE	REAL	ARRAY	TITLES	REFS	46				
3	TLMAX	REAL		SCALEF	REFS	48				
2	TLMIN	REAL		SCALEF	REFS	48				
2114	WO	REAL		/ /	REFS	31				
0	YDEP	REAL	ARRAY	RRR	REFS	47	57			

FILE NAMES		MODE					
0	INPUT						
155	OUTPUT						
3536	TAPE12						
732	TAPE13						
1406	TAPE41	UNFMT	READS	82	MOTION	80	
2442	TAPE42	UNFMT	WRITES	162			
0	TAPE5	FMT	READS	107	112	129	
155	TAPE6	FMT	WRITES	109	115	131	
	VARIABLES USED AS FILE NAMES. SEE ABOVE						

EXTERNALS	TYPE	ARGS	REFERENCES
AKSORT		2	114
CLOSEM		1	170
CTL31		0	161
FILEDA		19	139
OPENM		2	142

STATEMENT LABELS			DEF LINE	REFERENCES
5005	20	FMT	108	107
5013	25	FMT	110	109
5024	35	FMT	113	112
5032	50	FMT	116	115
4454	100		117	111
5046	150	FMT	130	129
5056	200	FMT	132	131
0	1000		163	160

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
4441		* KK	129 129	78	EXT REFS
4476		* KK	131 131	79	EXT REFS
4715	1000	* KK	160 163	68	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
/ /	1105	0 KLKL (400)	400 KK (1)	401 KL (80)			
		481 INFILE (1)	482 OBISO (1)	483 NOPRNT (5)			
		488 NOPTS (5)	493 OUTAPE (1)	494 INDISC (5)			
		499 FREQR (300)	799 LINFLT (1)	800 NDEPS (1)			
		801 IOPT (50)	851 FNDX (1)	852 IANG (160)			
		1012 IFXHP (80)	1092 JDISC (5)	1097 JPRNT (1)			
		1098 KPONT (1)	1099 BEGINX (1)	1100 WO (1)			
		1101 INTAPE (1)	1102 NRAYP (1)	1103 JREGNP (1)			
		1104 IBEGNP (1)					
CFILL	7	0 PROFILE(1)	1 SPCFILE(1)	2 CONFILE(1)			
		3 OANFILE(1)	4 NUMPRO (1)	5 NUMCON (1)			
		6 NUMOAN (1)					
LOSSA	11	0 SUBDEP (1)	1 FREQ (1)	2 ISII (1)			
		3 IFCOH (1)	4 IFAMD (1)	5 RTL1 (1)			
		6 NRTL (1)	7 DRTL (1)	8 IFM (1)			
		9 NTPMIC (1)	10 MICTAP (1)				
ABREAK	81	0 NBRK (1)	1 ANGBRK (80)				
RAYS	321	0 NANGLE (1)	1 THEO (160)	161 IFXH (160)			
PLTIN	5	0 ANGMAX (1)	1 ANGMIN (1)	2 NX (1)			
		3 NY (1)	4 NI (1)				
PLTINF	34	0 IFMIC (1)	1 NRTCAL (1)	2 NPLOT (1)			
		3 RPLOT (31)					
DEPTHS	2	0 BEGINY (1)	1 IOPTN (1)				
TITLES	8	0 TITLE (8)					
RBB	25	0 YDEP (5)	5 RTCAL (20)				
SCALEF	6	0 NTLPLT (1)	1 DRPLT (1)	2 TLMIN (1)			
		3 TLMAX (1)	4 NRX (1)	5 NDRY (1)			
FINPUT	37	0 FSAVE (30)	30 NFREQ (1)	31 NF (1)			
		32 IBOT (1)	33 KBOT (1)	34 NKBOT (1)			
		35 IPTR (1)	36 KPTR (1)				
X	1	0 IDISC (1)					
CCC	1	0 JTEST (1)					
ARVDA	47	0 ARVFIT (35)	35 ARVREC (7)	42 ARVKEY (3)			
		45 NGET (1)	46 KEYSAV (1)				

PROGRAM MAIN 74/74 OPT=2

EQUIV	CLASSES	LENGTH
KLKL	KLKL	1105
SURDEP	SURDEP	11
NBRK	NBRK	81
NANGLE	NANGLE	321
ANGMAX	ANGMAX	5
IFMIC	IFMIC	34
BEGINY	BEGINY	2
YDEP	YDEP	25
NTLPLT	NTLPLT	6
FSAVE	FSAVE	37

MEMBERS - BIAS NAME(LENGTH)
0 BLANKC (1105)
0 LOCSAC (11)
0 ABOEAC (81)
0 RAYSC (321)
0 PLTINC (5)
0 PLTIFC (34)
0 DEPTHC (2)
0 BBBC (25)
0 SCALFC (6)
0 FIMPUC (37)

1101 INTAPE (1) 1101 ITON (1)

STATISTICS

PROGRAM LENGTH	323B	211
BUFFER LENGTH	4612B	2442
CM LABELED COMMON LENGTH	1112B	586
CM BLANK COMMON LENGTH	2121B	1105

40000B CM USED

APPENDIX E

AUTO-OCEAN CALLS TO SITE DEPENDENT SOFTWARE

Appendix E presents full FORTRAN compilation listings of all program elements that reference possible site dependent software from program AUTO-OCEAN. These listings are included to assist the user in the event major modifications are needed when adapting to the appropriate subroutine calls at the bench mark site.

```
      PROGRAM BSCRAM      74/74   OPT=2 ROUND=*/                    FTN 4.6+460        02/14/80  13.34.12        PAGE     1

      1                 PROGRAM BSCRAM(OUTPUT,TAPE50,TAPE51,TAPE4)
                        DIMENSION KEY(280),DAT1(640),DAFIT(35),DAT2(541)
                C                     ENVIRONMENT FILE TO RANDOM(DA) FORMAT
                        REWIND 50
                5       CALL FILEDA(DAFIT,3LLEN,5LRATHY,2LEO,2LDA,2LRT,1LF,3LMRL,5410,
                       *3LMNR,5410,2LKL,10,3LMMR,20,3LMRL,27250)
                        CALL OPENM(DAFIT,3LNEW)
                        DO 20 I=1,48
                        AKEY=I
                11      READ(50) DAT2
                        CALL PUT(DAFIT,DAT2)
                20      CONTINUE
                        END


          SYMBOLIC REFERENCE MAP (R=3)

   ENTRY POINTS      DEF LINE      REFERENCES
     4265  BSCRAM          1

   VARIABLES      SN  TYPE            RELOCATION
     4351  AKEY     * REAL                          DEFINED        9
     6213  DAFIT      REAL       ARRAY               REFS          2          5          7         11
E    5013  DAT1       REAL      *UNDEF               REFS          2
2    6256  DAT2       REAL       ARRAY               REFS          2         11    DEFINED        10
     4350  I          INTEGER                        REFS          9    DEFINED         8
     4352  KEY        INTEGER   *UNDEF               REFS          2

   FILE NAMES        MODE
        0  OUTPUT
     1054  TAPE50     UNFMT                    READS        10      MOTION        4
     2130  TAPE51
     3240  TAPE4

   EXTERNALS          TYPE    ARGS       REFERENCES
          FILEDA                17             5
          OPENM                  2             7
          PUT                    2            11

   STATEMENT LABELS              DEF LINE    REFERENCES
        0  20                        12           8

   LOOPS  LABEL    INDEX      FROM-TO     LENGTH     PROPERTIES
     4276  20       * I          8 12         10B                EXT REFS

   STATISTICS
     PROGRAM LENGTH                3063B     1587
     BUFFER LENGTH                 4250B     2224
               50000  CM WORDS
```

```
SUBROUTINE LOOKUP     74/74   OPT=? ROUND=*/                FTN 4.6*460        11/08/79  16.44.41        PAGE     1

      1                SUBROUTINE LOOKUP(LAT,LON,ISEAS,DEPTH,IBC5,IBC9,WHT,MSQ,MSQS)      14SEP77    21
                C                                                                        14SEP77    22
                C          GIVEN THE LAT. AND LON. OF THE SE CORNER OF A 1 DEGREE SQUARE 14SEP77    23
                C          AND A SEASON, THIS ROUTINE DETERMINES THE MARSDEN SQUARE AND  14SEP77    24
      5         C          QUADRANT AND THE DEPTH, WAVE HEIGHT, AND 0-5 AND 0-9 BOTTOM   14SEP77    25
                C          TYPE VALUES.                                                  14SEP77    26
                C                                                                        14SEP77    27
                      DIMENSION DAFIT(35),IBYBL(180,3),WAVES(540),D1(541),D2(541)        AUTOC      314
                      REAL KEY,EKEY,WKEY                                                 AUTOC      315
     10               INTEGER  FIELD                                                     AUTOC      316
                      LOGICAL OPEN                                                       AUTOC      317
                      EQUIVALENCE (IBYBL,D1(2)),(WAVES,D2(2))                            AUTOC      318
                      DATA OPEN,EKEY,WKEY /.FALSE.,0.0,0.0/                              AUTOC      319
                C                                                                        AUTOC      320
     15         C        OPEN THE FILE ONCE ...                                          AUTOC      321
                C                                                                        AUTOC      322
                      IF(OPEN) GO TO 10                                                  AUTOC      323
                      CALL FILEDA(DAFIT,3LLEN,5LBATHY,2LFQ,2LDA,2LRT,1LF,3LMRL,5410,     AUTOC      324
                     X  3LMNR,5410,2LKL,10,3LHMB,20,3LMBL,27250)                         AUTOC      325
     20               CALL OPENM(DAFIT,5LINPUT)                                          AUTOC      326
                      OPEN=.TRUE.                                                        AUTOC      327
                C                                                                        AUTOC      328
                C        DETERMINE WHICH ENVIRONMENT BLOCK IS NEEDED,GET IT IF NOT HERE  AUTOC      329
                C                                                                        AUTOC      330
     25         10    KEY=(LON+8)/9                                                      AUTOC      331
                      IF(KEY.EQ.EKEY) GO TO 20                                           AUTOC      332
                      EKEY=KEY                                                           AUTOC      333
                      CALL GET(DAFIT,D1,EKEY,0)                                          AUTOC      334
                C                                                                        AUTOC      335
     30         C        DETERMINE WHICH WAVE BLOCK IS NEEDED,GET IT IF NOT HERE         AUTOC      336
                C                                                                        AUTOC      337
                20    IF(LON.LE.180) LON1=-LON                                           AUTOC      338
                      IF(LON.GT.180) LON1=360-LON                                        AUTOC      339
                      CALL MSQFQ(LAT,LON1,MSQ,MSQS,MSQ1)                                 AUTOC      340
     35               KEY=40.0 + 2.0*ISEAS - 1.0                                         AUTOC      341
                      IF(MSQ.GT.540) KEY=KEY+1.0                                         AUTOC      342
                      IF(KEY.EQ.WKEY) GO TO 30                                           AUTOC      343
                      WKEY=KEY                                                           AUTOC      344
                      CALL GET(DAFIT,D2,WKEY,0)                                          AUTOC      345
     40         C                                                                        AUTOC      346
                C        EXTRACT BATHYMETRY AND BOTTOM CLASS FROM IBYBL                  AUTOC      347
                C                                                                        AUTOC      348
                30    K1=MOD(LON,9)                                                      AUTOC      349
                      IF(K1.EQ.0) K1=9                                                   AUTOC      350
     45         C                                                                        AUTOC      351
                C        K2=COLUMN INDICATOR                                             AUTOC      352
                C        K3=FIELD INDICATOR                                              AUTOC      353
                C        K4=ROW INDICATOR                                                AUTOC      354
                      K2=(K1+2)/3                                                        AUTOC      355
     50               K3=MOD(K1,3)                                                       AUTOC      356
                      IF(K3.EQ.0) K3=3                                                   AUTOC      357
                      K4=90-LAT                                                          AUTOC      358
                      IF(LAT.LT.0) K4=90+IABS(LAT)                                       AUTOC      359
                       DEPTH=FIELD(14, 59-20*(K3-1), IBYBL(K4,K2) )                      14SEP77    28
     55                IBC=FIELD(6, 45-20*(K3-1), IBYBL(K4,K2) )                        14SEP77    29
                       IBC5=IBC/10                                                      14SEP77    30
                       IBC9=IBC-10*IBC5                                                 14SEP77    31
```

```
                C                                                          AUTOC     362
                C       EXTRACT WAVE HEIGHT FROM WAVES                     AUTOC     363
                C                                                          AUTOC     364
      60        C                                                          AUTOC     365
                      LOC=MSQ                                              AUTOC     366
                      IF(MSQ.GT.540) LOC=LOC-540                           AUTOC     367
                      WHT=FIELD(14,5A-15*(MSQS-1),WAVES(LOC))              AUTOC     368
                      WHT=0.10*WHT                                         AUTOC     369
      65        C                                                          AUTOC     370
                      RETURN                                               AUTOC     371
                      END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	LOOKUP	1	66

VARIABLES	SN	TYPE		RELOCATION							
2345	DAFIT	REAL	ARRAY		REFS	8	18	20	28	39	
0	DEPTH	REAL		F.P.	DEFINED	1	54				
253	D1	REAL	ARRAY		REFS	8	12	28			
1310	D2	REAL	ARRAY		REFS	8	12	39			
225	EKEY	REAL			REFS	9	26	28	DEFINED	13	27
251	IAC	INTEGER			REFS	56	57	DEFINED	55		
0	IAC5	INTEGER		F.P.	REFS	57	DEFINED	1	56		
0	IAC9	INTEGER		F.P.	DEFINED	1	57				
254	IBYBL	INTEGER	ARRAY		REFS	8	12	54	55		
0	ISEAS	INTEGER		F.P.	REFS	35	DEFINED	1			
242	KEY	REAL			REFS	9	26	27	36	37	38
					DEFINED	25	35	36			
245	K1	INTEGER			REFS	44	49	50	DEFINED	43	44
246	K2	INTEGER			REFS	54	55	DEFINED	49		
247	K3	INTEGER			REFS	51	54	55	DEFINED	50	51
250	K4	INTEGER			REFS	54	55	DEFINED	52	53	
0	LAT	INTEGER		F.P.	REFS	34	52	2*53	DEFINED	1	
252	LOC	INTEGER			REFS	62	63	DEFINED	61	62	
0	LON	INTEGER		F.P.	REFS	25	2*32	2*33	43	DEFINED	1
243	LON1	INTEGER			REFS	34	DEFINED	32	33		
0	MSQ	INTEGER		F.P.	REFS	34	36	61	62	DEFINED	1
244	MSQ1	* INTEGER			REFS	34					
0	MSQS	INTEGER		F.P.	REFS	34	63	DEFINED	1		
224	OPEN	LOGICAL			REFS	11	17	DEFINED	13	21	
1311	WAVES	REAL	ARRAY		REFS	8	12	63			
0	WHT	REAL		F.P.	REFS	64	DEFINED	1	63	64	
226	WKEY	REAL			REFS	9	37	39	DEFINED	13	38

EXTERNALS	TYPE	ARGS	REFERENCES				
FIELD	INTEGER	3	10	54	55	63	
FILEDA		17	18				
GET		4	28	39			
MSOFO		5	34				
OPENM		2	20				

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
IABS	INTEGER	1	INTRIN		51
MOD	INTEGER	2	INTRIN		43 50

STATEMENT LABELS	DEF LINE	REFERENCES
13 10	25	17
24 20	32	26
56 30	43	37

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
D1	541	1 IBYBL (540)
D2	541	1 WAVES (540)

STATISTICS

PROGRAM LENGTH 24408 1312

60000B CM USED

PROGRAM PSCRAM 74/74 OPT=2 -OUTPUT=37

```
1                PROGRAM PSCRAM(OUTPUT,TAPE50,TAPE51,TAPE6,TAPE6=OUTPUT)
                 C
                 C       THIS PROGRAM CONVERTS A SEQUENTIAL AUTO-OCEAN PROFILE FILE
                 C       TO A RANDOM FILE FOR USE BY AUTO-OCEAN.
                 C
5                      DIMENSION KEY(249),DAT1(640),DAT2(541),DAF11(35)
                       REWIND 51
                       CALL OPENMS(R,KEY,249,0)
                       DO 10 I=1,288
                         READ(51) DAT1
10                       CALL WRITMS(R,DAT1,640,I,-1,0)
                   10  CONTINUE
                       END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
4267 PSCRAM 1

			RELOCATION					
VARIABLES	SN	TYPE		REFS	6	11	DEFINED	10
7233 DAF11		REAL	#UNDEF	REFS	6			
4776 DAT1		REAL	ARRAY	REFS	6			
6176 DAT2		REAL	#UNDEF	REFS	11	DEFINED	9	
4334 I		INTEGER		REFS	6	8		
4335 KEY		INTEGER	ARRAY					

FILE NAMES	MODE				
0 OUTPUT					
1054 TAPE50	UNFMT	READS	10	MOTION	7
2130 TAPE51					
0 TAPE6					
3204 TAPE6					

EXTERNALS	TYPE	ARGS	REFERENCES
OPENMS		4	8
WRITMS		6	11

STATEMENT LABELS	DEF LINE	REFERENCES
0 10	12	9

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS
4275	10	* I	9 12	10B		

STATISTICS
PROGRAM LENGTH 30164 1550
BUFFER LENGTH 42600 2224
62000B CM USED

```
      SUBROUTINE RETREV(IMSQ,IMSQ5,SS,DEEP,NP,AUX,ISEAS)                AUTOC  391
      DIMENSION SS(30),DEEP(30),AUX(4),KEY(289),DATA(640)               AUTOC  392
      COMMON /FILKEY/ NUNIT,OPEN,KEY,DATA,IBIN                          AUTOC  393
      INTEGER FIELD                                                     AUTOC  394
      LOGICAL OPEN                                                      AUTOC  395
      DATA NUNIT/8/,OPEN/.FALSE./,IBIN/0/                               AUTOC  396
C                                                                       AUTOC  397
C        OPEN THE UNIT ... ONCE ONLY ...                                AUTOC  398
C                                                                       AUTOC  399
      IF(.NOT.OPEN) CALL OPENMS(NUNIT,KEY,289,0)                        AUTOC  400
      OPEN=.TRUE.                                                       AUTOC  401
C                                                                       AUTOC  402
C        CONVERT COORDINATES TO INTERNAL UNITS                          AUTOC  403
C                                                                       AUTOC  404
      MSQ=IMSQ                                                          AUTOC  405
      MSQ5=IMSQ5                                                        AUTOC  406
      IOFF=0                                                            AUTOC  407
      IF(IMSQ.GE.300) IOFF=144                                          AUTOC  408
      IF(IMSQ.GE.300) MSQ=IMSQ-299                                      AUTOC  409
      IBD1=MOD(MSQ,36)                                                  AUTOC  410
      IF(IBD1 .EQ.0) IBD1=36                                            AUTOC  411
      IBD=IBD1 + 36*(ISEAS-1) + IOFF                                    AUTOC  412
      IVG=(MSQ+35)/36                                                   AUTOC  413
      IW1=80*(IVG-1) + 1 + 20*(MSQ5-1)                                  AUTOC  414
      IW2=IW1+16                                                        AUTOC  415
C                                                                       AUTOC  416
C        READ DATA BLOCK                                                AUTOC  417
C                                                                       AUTOC  418
      IF(IBD.NE.IBIN) CALL READMS(NUNIT,DATA,640,IBD)                   AUTOC  419
      IBIN=IBD                                                          AUTOC  420
C                                                                       AUTOC  421
C        SET UP INDEX WORD FOR DESIRED PROFILE                          AUTOC  422
C                                                                       AUTOC  423
      NSTART=59                                                         AUTOC  424
      NP=DATA(IW2-1)                                                    AUTOC  425
C                                                                       AUTOC  426
C        RETRIEVE THE PROFILE                                           AUTOC  427
C                                                                       AUTOC  428
      DO 20 I=1,NP                                                      AUTOC  429
C                                                                       AUTOC  430
C        SOUND SPEED IS BIASED BEFORE STORAGE                           AUTOC  431
C                                                                       AUTOC  432
      ISS=FIELD(15,NSTART,DATA(IW1))                                    AUTOC  433
      IDP=FIELD(15,NSTART-15,DATA(IW1))                                 AUTOC  434
      SS(I)=1400.0 + 0.10*ISS                                           AUTOC  435
      DEEP(I)=IDP                                                       AUTOC  436
      NSTART=NSTART-30                                                  AUTOC  437
      IF(NSTART.GT.0) GO TO 20                                          AUTOC  438
      NSTART=59                                                         AUTOC  439
      IW1=IW1+1                                                         AUTOC  440
   20 CONTINUE                                                          AUTOC  441
C                                                                       AUTOC  442
C        RECOVER AUXILIARY WORDS                                        AUTOC  443
C                                                                       AUTOC  444
      DO 30 I=1,4                                                       AUTOC  445
      AUX(I)=DATA(IW2)                                                  AUTOC  446
   30 IW2=IW2+1                                                         AUTOC  447
```

```
                RETURN                                                  AUTOC    448
                END                                                     AUTOC    449


        SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE      REFERENCES
     3  RETREV           1        58

VARIABLES     SN  TYPE           RELOCATION
     0  AUX       REAL       ARRAY     F.P.       REFS        2   DEFINED      1        56
   443  DATA      REAL       ARRAY     FILKEY     REFS        2         3      29        35        43        44        56
     0  DEEP      REAL       ARRAY     F.P.       REFS        2   DEFINED      1        46
   153  I         INTEGER                         REFS       45        46      56   DEFINED      39        55
   146  IBD       INTEGER                         REFS     2*29        30   DEFINED      22
   145  IBDI      INTEGER                         REFS       21        22   DEFINED      20        21
  1643  IBIN      INTEGER                FILKEY   REFS        3        29   DEFINED       6        30
   155  IDP       INTEGER                         REFS       46   DEFINED      44
     0  IMSG      INTEGER                F.P.     REFS       15        18     2*19   DEFINED       1
     0  IMSGS     INTEGER                F.P.     REFS       16   DEFINED       1
   144  IOFF      INTEGER                         REFS       22   DEFINED      17        18
     0  ISEAS     INTEGER                F.P.     REFS       22   DEFINED       1
   154  ISS       INTEGER                         REFS       45   DEFINED      43
   147  IVG       INTEGER                         REFS       24   DEFINED      23
   150  IW1       INTEGER                         REFS       25        43      44        50   DEFINED      24        50
   151  IW2       INTEGER                         REFS       35        56      57   DEFINED      25        57
     2  KEY       INTEGER    ARRAY     FILKEY     REFS        2         3      10
   142  MSG       INTEGER                         REFS       20        23   DEFINED      15        19
   143  MSGS      INTEGER                         REFS       24   DEFINED      16
     0  NP        INTEGER                F.P.     REFS       39   DEFINED       1        35
   152  NSTART    INTEGER                         REFS       43        44      47        48   DEFINED      34        47
                                                   49
     0  NUNIT     INTEGER                FILKEY   REFS        3        10      29   DEFINED       6
     1  OPEN      LOGICAL                FILKEY   REFS        3         5      10   DEFINED       6        11
     0  SS        REAL       ARRAY     F.P.       REFS        2   DEFINED      1        45

EXTERNALS           TYPE    ARGS       REFERENCES
          FIELD     INTEGER    3            4        43        44
          OPENMS               4           10
          READMS               4           29

INLINE FUNCTIONS    TYPE    ARGS       DEF LINE  REFERENCES
          MOD       INTEGER    2  INTRIN              20

STATEMENT LABELS              DEF LINE   REFERENCES
   101  20                        51         39        48
     0  30                        57         55

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
    56  20     * I            39 51        268                EXT REFS
   107  30       1            55 57         28     INSTACK
```

```
COMMON BLOCKS   LENGTH     MEMBERS - BIAS NAME(LENGTH)
      FILKEY     932             0 NUNIT  (1)          1 OPEN   (1)          2 KEY    (289)
                               291 DATA   (640)        931 IBIN   (1)

STATISTICS
  PROGRAM LENGTH                1628      114
  CM LABELED COMMON LENGTH     16448      932
        600008 CM USED
```

APPENDIX F

NEWPE CALLS TO SITE DEPENDENT SOFTWARE

Appendix F presents full FORTRAN compilation listings of all program elements that reference possible site dependent software from program NEWPE. These listings are included to assist the user in the event major modifications are needed when adapting to the appropriate subroutine calls at the bench mark site.

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      SUBROUTINE PETL(RS,ZS,BEAM,ND,D,DMAX,RMAX,IFLAT,NWARN)                AFSD      21
C                                                                           PETL       3
C     PETL IS THE MAIN SUBROUTINE OF THE PARABOLIC EQUATION MODEL.          PETL       4
C     IT DEFINES CONSTANTS, CONTROLS THE RANGE LOOP, AND CREATES AN         PETL       5
C     UNFORMATTED OUTPUT FILE (DISK OR TAPE) CONTAINING RANGES AND          PETL       6
C     THE ASSOCIATED TRANSMISSION LOSS AT SPECIFIED DEPTHS.                 PETL       7
C                                                                           PETL       8
C     INPUT  - LP     FORTRAN OUTPUT UNIT (PRINTER)                         PETL       9
C              LT     FORTRAN OUTPUT UNIT (DISK OR TAPE)                    PETL      10
C              RMAX   MAXIMUM RANGE OF CALCULATION (FT)                     PETL      11
C              DMAX   MAXIMUM DEPTH (FT)                                    PETL      12
C              ND     NUMBER OF OUTPUT DEPTHS (.LE. 20)                     PETL      13
C              D      OUTPUT DEPTH ARRAY (ND DEPTHS)                        PETL      14
C              NPLT   NUMBER OF FIELD PLOT DEPTHS                           PETL      15
C              CD1    MINIMUM FIELD PLOT DEPTH                              PETL      16
C              CD2    MAXIMUM FIELD PLOT DEPTH                              PETL      17
C              ZS     INPUT DEPTH (FT)                                      PETL      18
C              IFLAT  FLAT BOTTOM FLAG (0 FOR FLAT BOTTOM)                  PETL      19
C              DR     CURRENT RANGE STEP (FT)                               PETL      20
C              F      FREQUENCY (HERTZ)                                     PETL      21
C              NC     NUMBER OF POINTS ON THE SOUND VELOCITY PROFILE        PETL      22
C              Z      DEPTH ARRAY (NC DEPTHS)                               PETL      23
C              C      SOUND SPEED ARRAY (NC SOUND SPEEDS)                   PETL      24
C              RNEXT  RANGE OF NEXT SOUND VELOCITY PROFILE (FT)             PETL      25
C              FLAG   INTEGRATION STATUS FLAG FROM STEP                     PETL      26
C              N      TRANSFORM SIZE (.LE.12)                               15DEC77   97
C                                                                           PETL      28
C     OUTPUT - NWARN  WARNING MESSAGE COUNT                                 PETL      29
C              ZMAX   MAXIMUM DEPTH SAMPLE IN THE TRANSFORM                 PETL      30
C              DCD    FIELD PLOT DEPTH INCREMENT                            PETL      31
C              CD     FIELD PLOT DEPTHS                                     PETL      32
C              DM     TRANSFORMED OUTPUT DEPTHS                             PETL      33
C              C0     REFERENCE SOUND SPEED (FT/SEC)                        PETL      34
C              MC     PHASE VELOCITY CORRECTION FLAG                        PETL      35
C              WL     ACOUSTIC WAVELENGTH (FT)                              PETL      36
C              FK     AVERAGE WAVE NUMBER                                   PETL      37
C              H      MESH INCREMENT IN TRANSFORM SPACE                     PETL      38
C              HK     RATIO OF MESH INCREMENT IN TRANSFORM SPACE            PETL      39
C                     TO AVERAGE WAVE NUMBER                                PETL      40
C              NPTS   NUMBER OF POINTS IN DEPTH MESH (NPTS = 2**N - 1)      PETL      41
C              HALF   HALF THE NUMBER OF DEPTH MESH POINTS                  PETL      42
C              DZ     DEPTH MESH INCREMENT (FT)                             PETL      43
C              NW     NUMBER OF MESH POINTS IN THE WATER COLUMN             PETL      44
C              NA     NUMBER OF MESH POINTS IN THE ABSORBING LAYER          PETL      45
C              R      CURRENT RANGE (FT)                                    PETL      46
C              NR     CURRENT RANGE STEP COUNT                              PETL      47
C              ZW     BOTTOM DEPTH AT CURRENT RANGE                         PETL      48
C              IB     MESH INDEX OF BOTTOM                                  PETL      49
C              LCR    LAST PRINT PLOT RANGE                                 PETL      50
C     INTERMEDIATE-                                                         26MAR79   66
C              IGRFLG FLAG INITIALIZED TO 0 IN PETL AND SET TO 1 IN         26MAR79   67
C                     BOTTOM WHEN THERE IS NOT AT LEAST 1 GRID MESH         26MAR79   68
C                     STRICTLY BETWEEN THE SURFACE AND BOTTOM. WHEN         26MAR79   69
C                     IGRFLG=1, BOTTOM RETURNS TO STEP WHICH IMMEDIATELY    26MAR79   70
C                     RETURNS TO PETL WHICH PRINTS A MESSAGE AND RETURNS    26MAR79   71
C                     TO THE MAIN PROGRAM.                                  26MAR79   72
C     FILE OUTPUT                                                           PETL      51
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C              RNM    CURRENT RANGE (NAUTICAL MILES)                          PETL      52
C              TL     TRANSMISSION LOSS (DB)                                  PETL      53
C                                                                             PETL      54
C     LOCAL VARIABLES - RR  RECIPROCAL RANGE                                  PETL      55
C                       NMAX  MAXIMUM TRANSFORM SIZE                          PETL      56
C                                                                             PETL      57
C     CONSTANTS - FNM  CONVERSION FACTOR FT/NAUTICAL MILE                     PETL      58
C                                                                             PETL      59
C     SUBROUTINES - FILTER (INTERPOLATE AND SMOOTH INDEX OF REFRACTION        PETL      60
C                           ON THE FIELD MESH)                                PETL      61
C                   INDEX  (CONSTRUCT INDEX OF REFRACTION TABLE)              PETL      62
C                   SPEED  (EVALUATE SOUND SPEED AT SPECIFIED DEPTH)          PETL      63
C                   SOURCE (GENERATE INITIAL FIELD)                           PETL      64
C                   SET    (CONSTRUCT STORED TABLES)                          PETL      65
C                   STEP   (SPLIT-STEP FOURIER INTEGRATION ALGORITHM)         PETL      66
C                   TLOSS   (INTERPOLATE FIELD AND RETURN                     PETL      67
C                            TRANSMISSION LOSS)                               PETL      68
C                   FLD     (FIELD PRINT PLOTTER)                             PETL      69
C                                                                             PETL      70
C     USER FURNISHED                                                          PETL      71
C                   SVP    (GET SOUND VELOCITY PROFILE)                       PETL      72
C                   ZB     (GET BOTTOM DEPTH AT CURRENT RANGE)                PETL      73
C                                                                             PETL      74
      LOGICAL RSR                                                             AFSD      22
      INTEGER TITLE, WHEN                                                     AFSD      23
      DIMENSION D(20),BUFO(21)                                                PETL      75
      COMMON/UNITS/LC,LP,LT,LZ                                                12JUN78   382
      COMMON /TL2/ NAVG,WINDOW,AD(20),ADM(20)                                 26MAR79   73
      COMMON /OUTBUF/ NOUT,RNM,TL(20)                                         PETL      77
      COMMON /HERTZ/ C0,H,HK,F,FK,FACTOR,WL                                   PETL      78
       COMMON/ GRDFLG /IGRFLG                                                 26MAR79   74
      COMMON /PHASE/ NC,Z(100),C(100),MC,DM(20)                               PETL      79
      COMMON /PLT/ TITLE(8),NPLT,LSR,ZLMIN,DCL,CD1,CD2,DCD,CD(120)            PETL      80
       COMMON/ BATHY  /RE,KB,NB,BR(101),BZ(101),NBS,BSR(11),THETA(11),        BATHYM     2
     1                 TB,RSR                                                BATHYM     3
C          COMMON  BATHY  CONTAINS BOTTOM INFO.                               BATHYM     4
C            NBS    - NO. OF BOTTOM LOSS DOMAINS. MUST BE .LE. MAXNBS AS     BATHYM     5
C                     DEFINED IN SUBROUTINE GETBOT.                           BATHYM     6
C            BSR    - BSR(I) IS THE STARTING RANGE FOR THE I-TH BOTTOM       BATHYM     7
C                     LOSS DOMAIN. READ IN AS NM. AND CONVERTED TO FT.        BATHYM     8
C            THETA  - THETA(I) IS THE CRITICAL ANGLE AT THE RANGE BSR(I)      BATHYM     9
C                     THETA IS READ IN AS DEG. AND CONVERTED TO RADIANS.      BATHYM    10
      COMMON /MESH/ R,DR,NR,KR,DZ,ZMAX,IR,N,NPTS,N2,N4,NL4,NA,NM,ZM,HALF      PETL      81
      COMMON/COSTR/LPL,NPPRM,RB1(10),RB2(10),NRB,VABSF,ATTEN                  15DEC77   93
     1            ,ALPHA                                                    23JAN78    7
      EQUIVALENCE (BUFO(1),RNM)                                               PETL      82
      DATA FT,FNM,TWOPI,CUT/0.3048,6076.1,6.28318530717959,-14.0/             PETL      83
      DATA RAD/0.17453292519943E-01/                                          AFSD      25
      DATA IFIRST/1/                                                          12JUN78   384
C                                                                             PETL      84
       IGRFLG=0                                                               26MAR79   75
C     DEFINE MAXIMUM TRANSFORM SIZE.                                          PETL      85
C                                                                             PETL      86
      NMAX = 4096                                                             15DEC77   94
C                                                                             PETL      97
C     SET THE FIELD PLOT DEPTH INCREMENT.                                     PETL      98
C                                                                             PETL      99
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      IF (NPLT.GT.0) DCO=AINT((CO2-CO1)/FLOAT(NPLT-1))                  PETL  100
C                                                                       PETL  101
C     SET THE PHASE VELOCITY CORRECTION FLAG.                           PETL  102
C                                                                       PETL  103
      REWIND 2                                                          AFSD   26
C                                                                       AFSD   27
      IF (CO.LE.0.) GO TO 5                                             PETL  104
C                                                                       PETL  105
C     THE REFERENCE SOUND SPEED HAS BEEN SPECIFIED.                     PETL  106
C     DO NOT TRANSFORM THE ENVIRONMENT TO REDUCE THE PARABOLIC PHASE    PETL  107
C     VELOCITY ERROR.  SET THE FLAG AND THE TRANSFORMED OUTPUT DEPTHS.  PETL  108
C                                                                       PETL  109
      MC=2                                                              PETL  110
C                                                                       PETL  111
      READ(2)                                                           AFSD   28
C                                                                       AFSD   29
      DO 1 I=1,ND                                                       PETL  112
    1 DM(I)=D(I)                                                        PETL  113
C                                                                       12JUN78  385
C         LOAD MODIFIED AVERAGE DEPTH ARRAY.                            12JUN78  386
C                                                                       12JUN78  387
      IF(NAVG .EQ. 0) GO TO 130                                         12JUN78  388
      LOOP=IABS(NAVG)                                                   12JUN78  389
      DO 120 J=1,LOOP                                                   12JUN78  390
        ADM(J) =AD(J)                                                   12JUN78  391
  120 CONTINUE                                                          12JUN78  392
  130 CONTINUE                                                          12JUN78  393
C                                                                       12JUN78  394
      IF (NPLT.LE.0) GO TO 8                                            PETL  114
      CO(1)=CO1                                                         PETL  115
      DO 2 I=2,NPLT                                                     PETL  116
    2 CO(I)=CO(I-1)+DCO                                                 PETL  117
      GO TO 8                                                           PETL  118
C                                                                       PETL  119
C     THE REFERENCE SOUND SPEED HAS NOT BEEN SPECIFIED.                 PETL  120
C     THE ENVIRONMENT WILL BE TRANSFORMED TO REDUCE THE PARABOLIC       PETL  121
C     PHASE VELOCITY ERROR.  SET THE FLAG AND DEFINE THE REFERENCE      PETL  122
C     SOUND SPEED.                                                      PETL  123
C                                                                       PETL  124
    5 MC=1                                                              PETL  125
C                                                                       PETL  126
      READ(2)CO                                                         AFSD   30
C                                                                       PETL  130
    8 IF (CO.LE.3000.) CO=CO/FT                                         PETL  131
C                                                                       15DEC77   95
C                    DEFINE THE VOLUME ATTENUATION FACTORS              15DEC77   96
C                                                                       15DEC77   97
      CONV=2.302585/(20.*FNM)                                           15DEC77   98
      FKHZ=F*.001                                                       15DEC77   99
      FKHZ2=FKHZ**2                                                     15DEC77  100
      IF(FKHZ .GT. 1.) GO TO 888                                        15DEC77  101
      ATTEN=.125*FKHZ2*CONV                                             15DEC77  102
      GO TO 889                                                         15DEC77  103
  888 CONTINUE                                                          15DEC77  104
      ATTEN=2.*FKHZ2*(.1/(1.+FKHZ2)+40./(4100.+FKHZ2))*CONV             15DEC77  105
  889 CONTINUE                                                          15DEC77  106
C                                                                       15DEC77  107
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                C                                                                 15DEC77  108
                C                                                                 15DEC77  109
                C                                                                 PETL     132
      175       C     DEFINE THE AVERAGE ACOUSTIC WAVELENGTH AND WAVE NUMBER      PETL     133
                C     AND THE MESH INCREMENT IN TRANSFORM SPACE.                  PETL     134
                C                                                                 PETL     135
                      WL=CO/F                                                     PETL     136
                      FK=TWOPI/WL                                                 PETL     137
      180              DZMAX=.375*WL/SIN(RAD*BEAM)                                23JAN78    8
                       ZMAX=DMAX                                                  23JAN78    9
                       IF( NBS .GT. 0) ZMAX=ZMAX+A.*DZMAX                         23JAN78   10
                       ZMAX=4.0*ZMAX/3.0                                          23JAN78   11
                      M=TWOPI/(ZMAX+ZMAX)                                         PETL     138
      185             MK=M/FK                                                     PETL     139
                C                                                                 15DEC77  110
                C                                                                 15DEC77  111
                C                        --TRANSFORM SIZE--                       15DEC77  112
                C              DETERMINE THE NUMBER OF POINTS REQUIRED            15DEC77  113
      190       C                                                                 15DEC77  114
                C                                                                 15DEC77  115
                       N=MAXO( INT( 1. + ALOG( ZMAX/DZMAX ) / ALOG(2.0) ), 6)     23JAN78   12
                C                                                                 PETL     147
                      WRITE(LP,900)N                                              PETL     148
      195       900   FORMAT(30H0SELECTED TRANSFORM SIZE = 2**,I2)                 PETL     149
                C                                                                 PETL     150
                C     DEFINE CONSTANTS.                                           PETL     151
                C                                                                 PETL     152
                10    NPTS=2**N                                                   PETL     153
      200       C                                                                 PETL     154
                C     CHECK TRANSFORM SIZE.                                       PETL     155
                C                                                                 PETL     156
                      IF (NPTS.LE.NMAX) GO TO 15                                  PETL     157
                C                                                                 PETL     158
      205             WRITE(LP,905)                                             PETL     159
                905   FORMAT(41H0TRANSFORM SIZE EXCEEDS ARRAY DIMENSIONS.)        PETL     160
                      STOP                                                        PETL     161
                C                                                                 PETL     162
                15    N2=NPTS/2                                                   PETL     163
      210             N4=N2/2                                                   PETL     164
                      NL4=NPTS-N4                                                 PETL     165
                       NA=NL4                                                     23JAN78   13
                      HALF=N2                                                     PETL     166
                      DZ=ZMAX/FLOAT(NPTS)                                         PETL     167
      215             NPTS=NPTS-1                                               PETL     168
                      NOUT=NO+1                                                   PETL     171
                C                                                                 PETL     176
                C     INITIALIZE FOR RANGE LOOP.                                  PETL     177
                C                                                                 PETL     178
      220             R=0.                                                      PETL     179
                      KB=0                                                        AFSD      35
                      NR=0                                                        PETL     180
                      KR=1                                                        PETL     181
                      LCR=0                                                       PETL     182
      225              IFIRPT=0                                                 20JUN79   28
                      NWARN=0                                                     PETL     183
                      IB=NPTS                                                     PETL     184
                      RE=RS                                                       AFSD      36
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                      RSR=NBS.EQ.0                                                  AESD      37
230                   IF (.NOT.RSR) NA=NA-8                                         AESD      38
                      READ(2)                                                       AESD      39
                17    CALL SVP(NC,Z,C,RNEXT)                                        AESD      40
                      IF (RE.GT.RNEXT) GO TO 17                                     AESD      41
                       CALL FILTER(ND, 0, DMAX)                                     23JAN78   14
235                   CALL DATE(WHEN)                                               AESD      42
                       PROGRM=10HPE                                                 13NOV79   23
                       IFORMT=10HPE                                                 13NOV79   24
                       WRITE(LT) TITLE, WHEN, F, ZS, NR, ND, (D(I),I=1,ND),PROGRM,IFORMT 13NOV79 25
                      NAVGA = IABS(NAVG)                                            25AUG78    4
240                   IF(NAVG .NE. 0 )                                              12JUN78  396
                     1      WRITE(LZ)TITLE,WHEN,F,ZS,NR,NAVGA,(AD(I),I=1,NAVGA),PROGRM,  13NOV79  26
                     2              IFORMT,WINDOW                                  13NOV79   27
                C                                                                   PETL     186
                       WRITE(3) PROGRM,IFORMT                                       13NOV79   28
245                    WRITE(3) TITLE,WHEN,F,ZS,NR,ND,(D(I),I=1,ND),NRB,(RB1(I),RB2(I),  15DEC77  119
                     *I=1,NRB)                                                      15DEC77  120
                C                                                                   15DEC77  121
                C     CONSTRUCT THE INITIAL FIELD.                                  PETL     187
                C                                                                   PETL     188
250                    ZSM=ZS                                                       PETL     189
                       IF (MC.EQ.1) ZSM=ZSM*SQRT(C0/SPEED(ZSM))                     PETL     190
                      CALL SOURCE(ZSM)                                              15DEC77  122
                C                                                                   PETL     192
                C     IF THE RANGE STEP HAS BEEN SPECIFIED, CONSTRUCT THE STORED    PETL     193
255             C     TABLES AND TURN OFF THE ERROR CHECKS BY ZEROING THE FLAGGED   PETL     194
                C     STEP COUNTER.                                                 PETL     195
                C                                                                   PETL     196
                       IF( DR .LE. 0.0) GO TO 18                                    23JAN78   15
                C                                                                   PETL     198
260                   KR=0                                                          PETL     199
                      CALL SET                                                      PETL     200
                C                                                                   PETL     201
                C     BEGIN RANGE LOOP.                                             PETL     202
                C                                                                   PETL     203
265              18    ASSIGN 30 TO LOOP                                            23JAN78   16
                C                                                                   PETL     205
                C     GET BOTTOM INDEX AT CURRENT RANGE.                            PETL     206
                C                                                                   PETL     207
                       IF (IFLAT.EQ.0) GO TO 30                                     PETL     208
270             C                                                                   PETL     209
                       ASSIGN 20 TO LOOP                                            23JAN78   17
                C                                                                   23JAN78   18
                 20    ZW=ZB(RE)                                                    23JAN78   19
                      IF (MC.EQ.1) ZW=ZW*SQRT(C0/SPEED(ZW))                         PETL     211
275                    IB=MIN0( INT( ZW/DZ +.5 ), NW)                               23JAN78   20
                       IF( RSR .AND. IB .EQ. NW) IB=NPTS                            23JAN78   21
                C                                                                   23JAN78   22
                 30    NR=NR+1                                                      23JAN78   23
                C                                                                   PETL     215
280             C     ADVANCE THE SOLUTION.                                         PETL     216
                C                                                                   PETL     217
                       CALL STEP(FLAG)                                              23JAN78   24
                C                                                                   PETL     219
                C          IF ROUTINE BOTTOM TOLD ROUTINE STEP (VIA VARIABLE IGRFLG)  26MAR79  76
285             C          THAT THERE WAS NOT AT LEAST 1 MESH GRID STRICTLY BETWEEN THE  26MAR79  77
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C           SURFACE AND BOTTOM, THEN PRINT A MESSAGE AND TERMINATE NOR-   26MAR79   78
C           MALLY.                                                        26MAR79   79
C                                                                         26MAR79   80
            IF( IGRFLG .EQ. 0) GO TO 37                                   26MAR79   81
290         RM=R/FNM                                                      26MAR79   82
            WRITE(LP,35) RM                                               26MAR79   83
 35         FORMAT(//,10X,67(1H-),/,                                      26MAR79   84
     1           20X,18HRUN TERMINATED AT ,F9.3,10H NM DUE TO  ,/,        26MAR79   85
     2           20X,45HLACK OF GRID MESH BETWEEN SURFACE AND BOTTOM.,/,  26MAR79   86
295  3           10X,67(1H-))                                             26MAR79   87
            GO TO 100                                                     26MAR79   88
C                                                                         26MAR79   89
 37         CONTINUE                                                      26MAR79   90
            R=R+DR                                                        PETL      220
300         RE=R*RS                                                       AFSD       46
            RNM=R/FNM                                                     PETL      221
            RR=9.0/R                                                      PETL      222
C                                                                         PETL      223
C     INTERPOLATE FOR TRANSMISSION LOSS AT OUTPUT DEPTHS.                 PETL      224
305   C                                                                   PETL      225
            DO 40 I=1,ND                                                  PETL      226
 40         TL(I)=TLOSS(RR,DM(I))                                         PETL      227
C                                                                         12JUN78   398
C         AVERAGE TRANSMISSION LOSS CALCULATIONS.                         12JUN78   399
310   C                                                                   12JUN78   400
      IF(NAVG .NE. 0) CALL TLOSS2(RNM,IFIRST)                             12JUN78   401
C                                                                         PETL      228
C     DUMP RANGE AND TRANSMISSION LOSS TO OUTPUT TAPE.                    PETL      229
C                                                                         PETL      230
315         WRITE(LT)(BUFO(I),I=1,NOUT)                                   PETL      231
C                                                                         PETL      232
C     PRINT FIELD PLOT IF FLAGGED.                                        PETL      233
C                                                                         PETL      234
            IF( NPLT .GT. 1) CALL FLD(RR,IFIRPT)                          20JUN79    29
320   C                                                                   PETL      236
C         WRITE OUT REAL AND IMAGINARY PARTS OF FIELD ON TAPE3.           15DEC77   123
C                                                                         15DEC77   124
            IF( NRB .LE. 0) GO TO 46                                      15DEC77   125
            RTEST=RE/FNM                                                  15DEC77   126
325         DO 45 I=1,NRB                                                 15DEC77   127
              IF( RB1(I) .LE. RTEST .AND. RTEST .LE. RB2(I) )             15DEC77   128
     1           CALL AMPHA(RE, ND, 0)                                    15DEC77   129
 45         CONTINUE                                                      15DEC77   130
 46         CONTINUE                                                      15DEC77   131
330   C                                                                   15DEC77   132
C     CHECK FOR NEW VELOCITY PROFILE.                                     PETL      237
C                                                                         PETL      238
            IF (RE.LT.RNEXT) GO TO 60                                     AFSD       47
C                                                                         PETL      240
335   50    CALL SVP(NC,Z,C,RNEXT)                                        PETL      241
            IF (RE.GE.RNEXT) GO TO 50                                     AFSD       48
            CALL FILTER(ND, 0, DMAX)                                      23JAN78    25
            CALL INDEX                                                    PETL      244
C                                                                         PETL      245
340   60    IF (FLAG) 61,90,70                                            PETL      246
C                                                                         PETL      247
C     PROCESS AN ERROR RETURN FROM STEP.                                  PETL      248
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                C                                                                PETL      249
                70    WRITE(LP,910)RNM                                           PETL      250
      345       910   FORMAT(26H0****WARNING - AT RANGE = ,F7.2,4H NM,)           PETL      251
                C                                                                PETL      252
                C     COMPUTED RANGE STEP IS SMALL.                              PETL      253
                C                                                                PETL      254
                      WRITE(LP,920)FLAG                                          PETL      255
      350        920   FORMAT(15X, 31HRATIO OF COMPUTED RANGE STEP TO,            20JUN79    30
                1            22H ACOUSTIC WAVELENGTH =,E10.3)                    PETL      257
                C                                                                PETL      258
                      NWARN=NWARN+1                                              PETL      259
                C                                                                PETL      260
      355             IF (NWARN.GE.5) GO TO 100                                  PETL      261
                C                                                                PETL      262
                      WRITE(LP,930)                                              PETL      263
                930   FORMAT(15X,33HPROCEEDING AT CURRENT RANGE STEP.)           PETL      264
                      GO TO 90                                                   PETL      265
      360       C                                                                PETL      266
                C     TRANSFORM ALIASING TEST FAILED.                            PETL      267
                C                                                                PETL      268
                80    WRITE(LP,910)RNM                                           PETL      269
                      WRITE(LP,940)FLAG                                          PETL      270
      365       940   FORMAT(15X,25HTRANSFORM ALIASING TEST =,F6.1,4H DB.)       PETL      271
                C                                                                PETL      272
                      NWARN=NWARN+1                                              PETL      273
                C                                                                PETL      274
                C     TERMINATE THE RUN IF ALIASING IS SEVERE.                   PETL      275
      370       C                                                                PETL      276
                      IF (FLAG.GT.CUT) NWARN=NWARN+4                             PETL      277
                C                                                                PETL      278
                      IF (NWARN.GE.5) GO TO 100                                  PETL      279
                C                                                                PETL      280
      375       C     END RANGE LOOP.                                            PETL      281
                C                                                                PETL      282
                 90    IF( R .LT. RMAX) GO TO LOOP,(20,30)                       23JAN78    26
                C                                                                PETL      284
                100   RETURN                                                     PETL      285
      380             END                                                        PETL      286
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CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

104 I CONSTANT TOO LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	PETL	1	379

VARIABLES	SN	TYPE	RELOCATION								
2	AD	REAL	ARRAY	TL2	REFS	85	139	240			
26	ADM	REAL	ARRAY	TL2	REFS	85	DEFINED	139			
31	ALPHA	REAL		COSTR	REFS	101					
30	ATTEN	REAL		COSTR	REFS	101	DEFINED	166	169		
0	BEAM	REAL		F.P.	REFS	180	DEFINED	1			
3	BR	REAL	ARRAY	BATHY	REFS	91					
316	BSR	REAL	ARRAY	BATHY	REFS	91					
0	BUFO	REAL	ARRAY	OUTBUF	REFS	83	103	315			
150	BZ	REAL	ARRAY	BATHY	REFS	91					
145	C	REAL	ARRAY	PHASE	REFS	89	232	335			
17	CD	REAL	ARRAY	PLT	REFS	90	146	DEFINED	144	146	
14	CD1	REAL		PLT	REFS	90	115	144			
15	CD2	REAL		PLT	REFS	90	115				
12	CLMIN	REAL		PLT	REFS	90					
756	CONV	REAL			REFS	166	169	DEFINED	162		
514	CUT	REAL			REFS	371	DEFINED	104			
0	C0	REAL		HERTZ	REFS	87	121	2*158	178	251	274
					DEFINED	156	158				
0	D	REAL	ARRAY	F.P.	REFS	83	132	234	238	245	326
					DEFINED	1					
16	DCD	REAL		PLT	REFS	90	146	DEFINED	115		
13	DCL	REAL		PLT	REFS	90					
312	DM	REAL	ARRAY	PHASE	REFS	89	307	DEFINED	132		
8	DMAX	REAL		F.P.	REFS	181	234	337	DEFINED	1	
1	DR	REAL		MESH	REFS	100	258	293			
4	DZ	REAL		MESH	REFS	100	275	DEFINED	214		
761	DZMAX	REAL			REFS	182	192	DEFINED	180		
3	F	REAL		HERTZ	REFS	87	163	178	238	240	245
5	FACTOR	REAL		HERTZ	REFS	87					
4	FK	REAL		HERTZ	REFS	87	185	DEFINED	179		
757	FKHZ	REAL			REFS	164	165	DEFINED	163		
760	FKH72	REAL			REFS	166	3*169	DEFINED	164		
770	FLAG	REAL			REFS	282	340	349	364	371	
512	FNM	REAL			REFS	162	290	301	324	DEFINED	104
511	FT	REAL			REFS	158	DEFINED	104			
1	H	REAL		HERTZ	REFS	87	185	DEFINED	184		
17	HALF	REAL		MESH	REFS	100	DEFINED	213			
2	HK	REAL		HERTZ	REFS	87	DEFINED	185			
753	I	INTEGER			REFS	2*132	2*146	238	240	3*245	2*307
						2*326	DEFINED	131	145	238	240
						315	325				
6	IB	INTEGER		MESH	REFS	100	276	DEFINED	227	275	276
762	IFIRPT	INTEGER			REFS	319	DEFINED	225			
516	IFIRST	INTEGER			REFS	311	DEFINED	106			
0	IFLAT	INTEGER		F.P.	REFS	269	DEFINED	1			
765	IFORMT	INTEGER			REFS	238	240	244	DEFINED	237	
0	IGRFLG	INTEGER		GRDFLG	REFS	88	289	DEFINED	108		
755	J	INTEGER			REFS	2*139	DEFINED	138			
1	KB	INTEGER		BATHY	REFS	91	DEFINED	221			
3	KR	INTEGER		MESH	REFS	100	DEFINED	223	260		
0	LC	INTEGER		UNITS	REFS	84					
11	LCR	INTEGER		PLT	REFS	90	DEFINED	224			
754	LOOP	INTEGER			REFS	138	377	DEFINED	137	265	271
1	LP	INTEGER		UNITS	REFS	84	I/O REFS	196	205	291	344
						357	363	364			
0	LPL	INTEGER		COSTR	REFS	101					

VARIABLES	SN	TYPE		RELOCATION								
2	LT	INTEGER		UNITS	REFS	84	I/O REFS	238	315			
3	LZ	INTEGER		UNITS	REFS	84	I/O REFS	240				
311	MC	INTEGER		PHASE	REFS	89	251	274	DEFINED	127	154	
7	N	INTEGER		MESH	REFS	100	194	199	DEFINED	192		
14	NA	INTEGER		MESH	REFS	100	230	DEFINED	212	230		
0	NAVG	INTEGER		TL2	REFS	85	136	137	239	240	311	
766	NAVGA	INTEGER			REFS	2*240	DEFINED	239				
2	NB	INTEGER		BATHY	REFS	91						
315	NBS	INTEGER		BATHY	REFS	91	182	229				
0	NC	INTEGER		PHASE	REFS	89	232	335				
8	ND	INTEGER		F.P.	REFS	131	216	234	2*238	2*245	306	326
						337	DEFINED	1				
13	NL4	INTEGER		MESH	REFS	100	212	DEFINED	211			
752	NMAX	INTEGER			REFS	203	DEFINED	111				
0	NOUT	INTEGER		OUTBUF	REFS	86	315	DEFINED	216			
10	NPLT	INTEGER		PLT	REFS	90	2*115	143	145	319		
1	NPPRM	INTEGER		COSTR	REFS	101						
10	NPTS	INTEGER		MESH	REFS	100	203	209	211	214	215	227
						276	DEFINED	199	215			
2	NR	INTEGER		MESH	REFS	100	238	240	245	278		
					DEFINED	222	278					
26	NRB	INTEGER		COSTR	REFS	101	2*245	323	325			
15	NW	INTEGER		MESH	REFS	100	275	276				
0	NWARN	INTEGER		F.P.	REFS	353	355	367	371	373		
					DEFINED	1	226	353	367	371		
11	N2	INTEGER		MESH	REFS	100	210	213	DEFINED	209		
12	N4	INTEGER		MESH	REFS	100	211	DEFINED	210			
764	PROGRM	REAL			REFS	238	240	244	DEFINED	236		
0	R	REAL		MESH	REFS	100	290	299	300	301	302	377
					DEFINED	220	294					
515	RAD	REAL			REFS	180	DEFINED	105				
2	RB1	REAL	ARRAY	COSTR	REFS	101	245	326				
14	RB2	REAL	ARRAY	COSTR	REFS	101	245	326				
8	RE	REAL		BATHY	REFS	91	233	273	324	326	333	336
					DEFINED	228	300					
771	RM	REAL			REFS	291	DEFINED	290				
0	RMAX	REAL		F.P.	REFS	377	DEFINED	1				
763	RNEXT	REAL			REFS	232	233	333	335	336		
1	RNM	REAL		OUTBUF	REFS	86	103	311	344	363		
					DEFINED	301						
772	RR	REAL			REFS	307	319	DEFINED	302			
0	RS	REAL		F.P.	REFS	228	300	DEFINED	1			
345	RSR	LOGICAL		BATHY	REFS	81	91	230	276	DEFINED	229	
773	RTEST	REAL			REFS	2*326	DEFINED	324				
344	T8	REAL		BATHY	REFS	91						
331	THETA	REAL	ARRAY	BATHY	REFS	91						
0	TITLE	INTEGER	ARRAY	PLT	REFS	82	90	238	240	245		
1	TL	REAL	ARRAY	OUTBUF	REFS	86	DEFINED	307				
513	TWOPI	REAL			REFS	179	184	DEFINED	104			
27	VABSF	REAL		COSTR	REFS	101						
751	WHEN	INTEGER			REFS	82	235	238	240	245		
1	WINDOW	REAL		TL2	REFS	85	240					
6	WL	REAL		HERTZ	REFS	87	179	180	DEFINED	178		
1	Z	REAL	ARRAY	PHASE	REFS	89	232	335				
5	ZMAX	REAL		MESH	REFS	100	182	183	2*184	192	214	
					DEFINED	181	182	183				
0	ZS	REAL		F.P.	REFS	238	240	245	250	DEFINED	1	

```
VARIABLES      SN  TYPE          RELOCATION
  767  ZSM        REAL                          REFS      2*251     252    DEFINED     250     251
   16  ZW         REAL                  MESH    REFS        100   2*274     275    DEFINED     273     274

FILE NAMES        MODE
      TAPE2       UNFMT                 READS     129       156     231    MOTION      119
      TAPE3       UNFMT                 WRITES    244       245
      VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS          TYPE    ARGS       REFERENCES
      ALOG         REAL       1 LIBRARY   2*192
      AMPHA                   3              326
      DATE                    1              235
      FILTER                  3              234       337
      FLO                     2              319
      INDEX                   0              338
      SET                     0              261
      SIN          REAL       1 LIBRARY     180
      SOURCE                  1              252
      SPEED        REAL       1              251       274
      SQRT         REAL       1 LIBRARY     251       274
      STEP                    1              282
      SVP                     4              232       335
      TLOSS        REAL       2              307
      TLOSS2                  2              311
      ZB           REAL       1              273

INLINE FUNCTIONS   TYPE    ARGS       DEF LINE  REFERENCES
      AINT         REAL       1  INTRIN              115
      FLOAT        REAL       1  INTRIN              115       214
      IABS         INTEGER    1  INTRIN              137       239
      INT          INTEGER    1  INTRIN              192       275
      MAX0         INTEGER    0  INTRIN              192
      MIN0         INTEGER    0  INTRIN              275

STATEMENT LABELS                 DEF LINE   REFERENCES
     0  1                          132        131
     0  2                          146        145
    58  5                          154        121
    53  8                          158        143       147
     0  10          INACTIVE       199
   137  15                         209        207
   167  17                         232        233
   264  18                         265        258
   270  20                         273        271       377
   312  30                         278        265       269       377
   631  35      FMT                292        291
   325  37                         298        289
     0  40                         307        306
     0  45                         328        325
   376  46                         329        327
   408  50                         335        336
   413  60                         340        333
     0  70          INACTIVE       344        340
   426  80                         363        340
   441  90                         377        340       359
   446  100                        379        296       355       373
     0  120                        140        139
```

STATEMENT LABELS			DEF LINE	REFERENCES	
40	130		141	136	
66	888		168	165	
75	889		170	167	
533	986	FMT	195	194	
543	985	FMT	206	205	
655	910	FMT	345	344	363
667	920	FMT	350	349	
762	930	FMT	358	357	
720	940	FMT	365	364	

LOOPS	LABEL		INDEX	FROM-TO	LENGTH	PROPERTIES	
30	1		I	131 132	2B	INSTACK	
35	120		J	138 140	3B	INSTACK	
45	2		I	145 146	2B	INSTACK	
235		*	I	245 245	10B		EXT REFS
334	48	*	I	306 307	7B		EXT REFS
363	45	*	I	325 328	13B		EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
UNITS	4	0	LC	(1)	1	LP	(1)	2	LT	(1)	
		3	LZ	(1)							
TL2	42	0	NAVG	(1)	1	WINDOW	(1)	2	AD	(20)	
		22	ADM	(20)							
OUTBUF	22	0	NOUT	(1)	1	RNM	(1)	2	TL	(20)	
HERTZ	7	0	CO	(1)	1	H	(1)	2	HK	(1)	
		3	F	(1)	4	FK	(1)	5	FACTOR	(1)	
		6	WL	(1)							
GRDFLG	1	0	IGRFLG	(1)							
PHASE	222	0	NC	(1)	1	Z	(100)	101	C	(100)	
		201	MC	(1)	202	DM	(20)				
PLT	135	0	TITLE	(8)	8	NPLT	(1)	9	LCR	(1)	
		10	CLMIN	(1)	11	DCL	(1)	12	CO1	(1)	
		13	CO2	(1)	14	DCO	(1)	15	CO	(120)	
BATHY	230	0	RE	(1)	1	KB	(1)	2	NB	(1)	
		3	BR	(101)	104	BZ	(101)	205	NBS	(1)	
		206	BSR	(11)	217	THETA	(11)	228	TB	(1)	
		229	RSR	(1)							
MESH	16	0	R	(1)	1	DR	(1)	2	NR	(1)	
		3	KR	(1)	4	DZ	(1)	5	ZMAX	(1)	
		6	IB	(1)	7	N	(1)	8	NPTS	(1)	
		9	N2	(1)	10	N4	(1)	11	NL4	(1)	
		12	NA	(1)	13	NM	(1)	14	ZM	(1)	
		15	HALF	(1)							
COSTR	26	0	LPL	(1)	1	NPPRM	(1)	2	RB1	(10)	
		12	RB2	(10)	22	NRB	(1)	23	VABSF	(1)	
		24	ATTEN	(1)	25	ALPHA	(1)				

EQUIV CLASSES	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)			
NOUT RNM	21	3	BUFO	(21)	1	TL	(26)

STATISTICS

PROGRAM LENGTH	1035B	517
CP LABELED COMMON LENGTH	1361B	705

125000B CM USED

APPENDIX G

SYNACC CALLS TO SITE DEPENDENT SOFTWARE

Appendix G presents full FORTRAN compilation listings of all program elements that reference possible site dependent software from program SYNACC. These listings are included to assist the user in the event major modifications are needed when adapting to the appropriate subroutine calls at the bench mark site.

```
      SUBROUTINE GROBLK(LPRINT,MSQLOC,IZ,ICOL,IROW,IOMIT)                GROBLK      2
C                                                                        GROBLK      3
C         THIS SUBROUTINE ATTACHES A SYNAPS FILE BY PERFORMING           GROBLK      4
C                                                                        GROBLK      5
C                 ATTACH,TAPE1,FINALGRIDNNNN,ID=PVPV                     GROBLK      6
C                                                                        GROBLK      7
C         WHERE NNNN IS FROM 2 TO 4 DECIMAL DIGITS  INDICATING A MARS-   GROBLK      8
C         DEN SQUARE AND QUADRANT. E.G., FINALGRID104  IS THE DATA FOR   GROBLK      9
C         10 DEGREE MARSDEN SQUARE 10, QUADRANT 4.                       GROBLK     10
C           AFTER PERFORMING THE ATTACH, THE DATA IS READ INTO THE       GROBLK     11
C         ARRAY IZ.                                                      GROBLK     12
C           IF THE FILE IS NOT IN THE SYSTEM, A MESSAGE IS PRINTED, A    GROBLK     13
C         FLAG SET, AND THE SUBROUTINE RETURNS. ANY OTHER ERROR THAT     GROBLK     14
C         OCCURS WHEN TRYING TO PERFORM THE ATTACH WILL CAUSE A MESSAGE  GROBLK     15
C         TO BE PRINTED AND THE JOB ABORTED.                             GROBLK     16
C           IF, AFTER ATTACHING A FILE, THE MARSDEN SQUARE NUMBER IN     GROBLK     17
C         THE HEADER RECORD OF THE FILE DOES NOT MATCH THE FILE NAME,    GROBLK     18
C         (E.G., MSQ5=124 WITH FILE NAME FINALGRID901), THEN RETRIEVAL   GROBLK     19
C         IS TERMINATED, A MESSAGE PRINTED, A FLAG SET, AND THE ROUTINE  GROBLK     20
C         RETURNS.                                                       GROBLK     21
C                                                                        GROBLK     22
      DIMENSION ICHAR(4),IPRMS(22),NUMS(10),IZ(63,208)                   GROBLK     23
      LOGICAL IOMIT,LPRINT                                               GROBLK     24
      DATA          ID/4LPVRV/, IPFN1/9LFINALGRID/, NOTHER/10/           GROBLK     25
      DATA ITAPE1/1/                                                     GROBLK     26
      DATA LFN/5LTAPE1/                                                  GROBLK     27
      DATA NUMS/1H1, 1H2, 1H3, 1H4, 1H5, 1H6, 1H7, 1H8, 1H9, 1H0/        GROBLK     28
C                                                                        GROBLK     29
      CALL UNLOAD(ITAPE1)                                                GROBLK     30
      IOMIT = .FALSE.                                                    GROBLK     31
C                                                                        GROBLK     32
C         DETERMINE HOW MANY DECIMAL DIGITS IN MSQLOC (MUST BE 2,3 OR4)  GROBLK     33
C                                                                        GROBLK     34
      NDIGIT=2                                                           GROBLK     35
      IF( (MSQLOC .GT. 99) .AND. (MSQLOC .LT. 1000) ) NDIGIT=3           GROBLK     36
      IF( MSQLOC .GT. 999) NDIGIT=4                                      GROBLK     37
C                                                                        GROBLK     38
C         CONVERT THE DIGITS IN MSQLOC TO INDIVIDUAL BCD CHARACTERS      GROBLK     39
C         AND STORE THEM IN THE ARRAY ICHAR WITH THE RIGHTMOST DIGIT IN  GROBLK     40
C         IN MSQLOC BEING STORED IN ICHAR(1), ETC.                       GROBLK     41
C                                                                        GROBLK     42
      MSQ=MSQLOC                                                         GROBLK     43
      DO 200 I=1,NDIGIT                                                  GROBLK     44
        IDIG=MOD(MSQ,10)                                                 GROBLK     45
        IF( IDIG .EQ. 0) IDIG=10                                         GROBLK     46
        ICHAR(I)=NUMS(IDIG)                                              GROBLK     47
        MSQ=MSQ/10                                                       GROBLK     48
  200 CONTINUE                                                           GROBLK     49
C                                                                        GROBLK     50
      DO 300 I=1,22                                                      GROBLK     51
        IPRMS(I)=0                                                       GROBLK     52
  300 CONTINUE                                                           GROBLK     53
C                                                                        GROBLK     54
C         SET IRC TO INDICATE THAT AN ATTACH IS TO BE PERFORMED.         GROBLK     55
C         ALSO, SET UP THE ARRAY IPRMS.                                  GROBLK     56
C                                                                        GROBLK     57
      IRC=1                                                              GROBLK     58
```

```
      IPRMS(1)=LFN                                                      GRDBLK     59
      IPRMS(2)=IPFN1 .OR. ICHAR(NDIGIT)                                 GRDBLK     60
60    NCHAR=NDIGIT-1                                                    GRDBLK     61
      DO 400 I=1,NCHAR                                                  GRDBLK     62
        ICHAR(NDIGIT-I)=SHIFT( ICHAR(NDIGIT-I), 60-6*I )                GRDBLK     63
        IPRMS(3)=IPRMS(3) .OR. ICHAR(NDIGIT-I)                          GRDBLK     64
 400  CONTINUE                                                          GRDBLK     65
65    IPRMS(6)=IO                                                       GRDBLK     66
C                                                                       GRDBLK     67
C         SET IPRMS(12), THE MR PARAMETER, TO 1.                        GRDBLK     68
C                                                                       GRDBLK     69
      IPRMS(12)=1                                                       GRDBLK     70
70    C                                                                 GRDBLK     71
C         SET IPRMS(14) TO -1 TO INDICATE THAT THE CYCLE NUMBER OF THE  GRDBLK     72
C         ATTACHED FILE IS TO BE RETURNED IN IPRMS(14).                 GRDBLK     73
C                                                                       GRDBLK     74
      IPRMS(14)=-1                                                      GRDBLK     75
75    C                                                                 GRDBLK     76
C         SET NN TO THE LAST NON-ZERO WORD IN IPRMS.                    GRDBLK     77
C                                                                       GRDBLK     78
      NN=14                                                             GRDBLK     79
C                                                                       GRDBLK     80
80    CALL ZPFUNC(IRC, IPRMS, NN)                                       GRDBLK     81
C                                                                       GRDBLK     82
C         RECALL-NOTHER IS THE ERROR CODE FOR THE FILE NOT IN SYSTEM.   GRDBLK     83
C                                                                       GRDBLK     84
      IF( IRC .EQ. NOTHER ) GO TO 2000                                  GRDBLK     85
85    IF( IRC .NE. 0) GO TO 5000                                        GRDBLK     86
C                                                                       GRDBLK     87
C         THE FILE HAS BEEN SUCCESSFULLY ATTACHED.                      GRDBLK     88
C                                                                       GRDBLK     89
      IF(LPRINT)  PRINT 700, (IPRMS(I),I=1,3),IPRMS(6),IPRMS(14)        GRDBLK     90
90     700  FORMAT(///,41H THE FOLLOWING ATTACH HAS BEEN PERFORMED- ,/,  GRDBLK     91
     1         10X,8H ATTACH, A5,1H, A10,A3,4H,ID=,A4,4H,CY=,I1,1H,)     GRDBLK     92
      READ(ITAPE1,888) MSQS,ICOL,IROW                                   GRDBLK     93
 888  FORMAT(3I4)                                                       GRDBLK     94
      IF(LPRINT)  PRINT 825, MSQS,ICOL,IROW                             GRDBLK     95
95     825  FORMAT(50H THE ATTACHED SYNAPS FILE HAS HEADER DATA-  MSQS=,I4,  GRDBLK  96
     1        8H   ICOL=,I2,8H   IROW=,I3)                              GRDBLK     97
      IF( MSQLOC .NE. MSQS) GO TO 1000                                  GRDBLK     98
      DO 900 K=1,ICOL                                                   GRDBLK     99
        READ (ITAPE1,850)  (IZ(K,L),L=1,IROW)                           GRDBLK    100
100    850    FORMAT(16I5)                                              GRDBLK    101
 900  CONTINUE                                                          GRDBLK    102
      GO TO 3500                                                        GRDBLK    103
C ******************************************************************  GRDBLK    104
C                                                                       GRDBLK    105
105   C                    NON-FATAL ERROR PROCESSING                   GRDBLK    106
C                                                                       GRDBLK    107
C ******************************************************************  GRDBLK    108
 1000 CONTINUE                                                          GRDBLK    109
      PRINT 1100,  IPRMS(2),IPRMS(1),MSQS                               GRDBLK    110
110    1100  FORMAT(///,30H THE HEADER ON ATTACHED FILE  ,A10,A3,38H  CONTAINS  GRDBLK  111
     1 A MARSDEN SQUARE NUMBER OF ,I4/                                  GRDBLK    112
     2        69H THIS IS INCONSISTENT WITH THE FILE NAME - TAKE CARE OF  GRDBLK  113
     3 THIS PROBLEM.)                                                   GRDBLK    114
      GO TO 3000                                                        GRDBLK    115
```

```
      115           C                                                                      GRDRLK     116
                     2000  CONTINUE                                                       GRDRLK     117
                           PRINT 2100,   IPRMS(2),      IPRMS(3), IPRMS(6)               GRDRLK     118
                     2100  FORMAT(///,5H FILE ,A10,A3,5H, ID=,A4,23H, IS NOT IN THE SYSTEM.)GRDRLK   119
                     C                                                                    GRDRLK     120
      120            3000  CONTINUE                                                       GRDRLK     121
                           IOMIT = .TRUE.                                                 GRDRLK     122
                     C                                                                    GRDRLK     123
                      3500  CONTINUE                                                      GRDRLK     124
                           RETURN                                                         GRDRLK     125
      125           C                                                                      GRDRLK     126
                     C ***************************************************************** GRDRLK     127
                     C                                                                    GRDRLK     128
                     C                          FATAL ERROR PROCESSING                    GRDRLK     129
                     C                                                                    GRDRLK     130
      130            C ***************************************************************** GRDRLK     131
                      5000  CONTINUE                                                      GRDRLK     132
                           PRINT 5100,   IPRMS(2),IPRMS(3),IPRMS(6),IPRMS(1)              GRDRLK     133
                      5100  FORMAT(///,42H ERROR IN TRYING TO ATTACH PERMANENT FILE ,A10,A3,GRDRLK   134
                          15H, ID=,A4,18H, ON LOGICAL UNIT ,A5)                          GRDRLK     135
      135                   PRINT 5200,   IRC,IRC                                       GRDRLK     136
                      5200  FORMAT(16H    ERROR CODE = ,I3,5H  (= ,O3,7H OCTAL))        GRDRLK     137
                           PRINT 5300                                                     GRDRLK     138
                      5300  FORMAT(///,42H --- JOB ABORTED IN SUBROUTINE GRDRLK. ---)    GRDRLK     139
                           CALL ABORT                                                     GRDRLK     140
      140           C                                                                      GRDRLK     141
                          END                                                             GRDRLK     142
```


SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS — DEF LINE — REFERENCES

3	GRDRLK	1	124 141

VARIABLES — SN — TYPE — RELOCATION

360	I	INTEGER		REFS	46	51	3*62	63	89			
				DEFINED	43	50	61	85				
370	ICHAR	INTEGER	ARRAY	REFS	22	59	62	63	DEFINED	46	62	
0	ICOL	INTEGER	F.P.	REFS	94	98	DEFINED	1	92			
154	ID	INTEGER		REFS	65	DEFINED	24					
361	IDIG	INTEGER		REFS	45	46	DEFINED	44	45			
0	IOMIT	LOGICAL	F.P.	REFS	23	DEFINED	1	30	121			
155	IPFN1	INTEGER		REFS	59	DEFINED	24					
374	IPRMS	INTEGER	ARRAY	REFS	22	63	80	3*89	2*109	3*117	4*132	
				DEFINED	51	58	59	63	65	69	76	
362	IRC	INTEGER		REFS	80	84	85	2*135	DEFINED	57		
0	IROW	INTEGER	F.P.	REFS	94	99	DEFINED	1	92			
157	ITAPE1	INTEGER		REFS	29	DEFINED	25	I/O REFS	92	99		
0	IZ	INTEGER	ARRAY F.P.	REFS	22	DEFINED	1	99				
366	K	INTEGER		REFS	99	DEFINED	98					
367	L	INTEGER		REFS	99	DEFINED	99					
160	LEN	INTEGER		REFS	58	DEFINED	26					
0	LPRINT	LOGICAL	F.P.	REFS	23	89	96	DEFINED	1			
357	MSG	INTEGER		REFS	44	47	DEFINED	42	47			

VARIABLES SN TYPE RELOCATION

0	MSOLOC	INTEGER	F.P.	REFS	2*35	36	42	97	DEFINED	1
365	MSOS	INTEGER		REFS	94	97	109	DEFINED	92	
363	MCHAR	INTEGER		REFS	61	DEFINED	60			
356	NDIGIT	INTEGER		REFS	43	59	60	2*62	63	
				DEFINED	34	35	36			
156	NOTMER	INTEGER		REFS	84	DEFINED	24			
422	NUMS	INTEGER	ARRAY	REFS	22	46	DEFINED	27		
364	NW	INTEGER		REFS	80	DEFINED	78			

FILE NAMES MODE

OUTPUT	FMT	WRITFS	89	94	109	117	132	135	137

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
ABORT		0	139
UNLOAD		1	29
ZPFUNC		3	80

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
MOD	INTEGER	2	INTRIN		44
SHIFT	NO TYPE	2	INTRIN		62

STATEMENT LABELS			DEF LINE	REFERENCES
0	200		48	43
0	300		52	50
0	400		64	61
167	700	FMT	90	89
211	800	FPT	93	92
221	825	FPT	95	94
242	850	FPT	100	99
0	900		101	98
125	1000		108	97
252	1100	FPT	110	109
130	2000		116	84
302	2100	FMT	118	117
132	3000		120	114
133	3500		123	102
134	5000		131	85
320	5100	FPT	133	132
337	5200	FMT	136	135
350	5300	FPT	138	137

LOOPS	LABEL		INDEX	FROM-TO	LENGTH	PROPERTIES		
30	200		I	43 48	12B	OPT		
43	300		I	50 52	2B	INSTACK		
54	400		I	61 64	3B	INSTACK		
104	900	*	R	98 101	21B		EXT REFS	NOT INNER
111		*	L	99 99	10B		EXT REFS	

STATISTICS

PROGRAM LENGTH 44.8 28B

600008 CM USED

APPENDIX H

INTERACT CALLS TO SITE DEPENDENT SOFTWARE

Appendix H presents full FORTRAN compilation listings of all program elements that reference possible site dependent software from program INTERACT. These listings are included to assist the user in the event major modifications are needed when adapting to the appropriate subroutine calls at the bench mark site.

```
      PROGRAM INRACT(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,                 INRACT     2
     1                TAPE1=/80, TAPE2=/80,                                 INRACT     3
     2                TAPE10, TAPE20, TAPE30 )                              INRACT     4
      LOGICAL YES,CREATE,INTRFC,PLOT                                        INRACT     5
      INTEGER DATIN,DATOUT                                                  INRACT     6
                                                                            INRACT     7
      COMMON/ CNTROL / MORE,CREATE,ORANGE                                   INRACT     8
      COMMON/ IBATH  / NBCP,RTEMP(201),DTEMP(201),INTRFC,PLOT               INRACT     9
      COMMON/ UNITS  / DATIN,DATOUT                                         INRACT    10
C                                                                           INRACT    11
C                                                                           INRACT    12
C                                                                           INRACT    13
C                                                                           INRACT    14
C                                                                           INRACT    15
C                     INITIALIZE FILES                                      INRACT    16
      DATIN = 10                                                            INRACT    17
      DATOUT = 20                                                           INRACT    18
      CALL CONNEC(1)                                                        INRACT    19
      CALL CONNEC(2)                                                        INRACT    20
C                                                                           INRACT    21
C                                                                           INRACT    22
   50 CONTINUE                                                              INRACT    23
C                                                                           INRACT    24
C                                                                           INRACT    25
C                                                                           INRACT    26
      CREATE = .FALSE.                                                      INRACT    27
      INTRFC = .FALSE.                                                      INRACT    28
      PLOT   = .FALSE.                                                      INRACT    29
      WRITE(2,100)                                                          INRACT    30
  100 FORMAT(   47H1WELCOME TO INTERACT.  WITH THIS SYSTEM YOU CAN  */*     INRACT    31
     *           44H   1) CREATE AN INPUT DATA SET FOR INTERFACE    */*     INRACT    32
     *           44H   2) MODIFY AN INPUT DATA SET FOR INTERFACE    */*     INRACT    33
     *           46H   3) CREATE AN INPUT DATA SET FOR CFIELD PLOT  */*     INRACT    34
     *           46H   4) MODIFY AN INPUT DATA SET FOR CFIELD PLOT  */*     INRACT    35
     *           43H ENTER THE INDEX OF THE FUNCTION TO PERFORM     */)    INRACT    36
C                                                                           INRACT    37
C                                                                           INRACT    38
      READ(1,*) NDEX                                                        INRACT    39
      CALL TSTNDX(NDEX,1,4)                                                 INRACT    40
      IF (NDEX .EQ. 1  .OR.  NDEX .EQ. 3) GO TO 500                         INRACT    41
C                                                                           INRACT    42
C                     MAKE SURE THERE IS A FILE TO REVIEW                   INRACT    43
      CALL RVWAIT                                                           INRACT    44
  500 CONTINUE                                                              INRACT    45
C                                                                           INRACT    46
C                                                                           INRACT    47
C                                                                           INRACT    48
      GO TO (1000,2000,3000,4000), NDEX                                     INRACT    49
C                                                                           INRACT    50
C                                                                           INRACT    51
 1000 CONTINUE                                                              INRACT    52
C                                                                           INRACT    53
C                     CREATE AN INPUT DATA SET FOR INTERFACE                INRACT    54
C                                                                           INRACT    55
      CREATE=.TRUE.                                                         INRACT    56
      INTRFC = .TRUE.                                                       INRACT    57
      WRITE(2,1100)                                                         INRACT    58
```

```
 1100  FORMAT(   46HWILL THERE BE AUTO-OCEAN INPUT DATA (Y OR N) )          INRACT     59
       IF( .NOT. YES(0)) GO TO 1900                                        INRACT     60
                                                                           INRACT     61
C                                                                          INRACT     62
C                    AUTO-OCEAN DATA PRESENT                               INRACT     63
C                                                                          INRACT     64
       CALL INOVRD                                                         INRACT     65
       GO TO 90000                                                         INRACT     66
C                                                                          INRACT     67
C                    NO AUTO-OCEAN ALL DATA MUST BE INPUT                  INRACT     68
C                                                                          INRACT     69
 1900  CONTINUE                                                            INRACT     70
C                                                                          20SEP79    1
       CALL INCFLD                                                         INRACT     72
       GO TO 90000                                                         INRACT     73
 2000  CONTINUE                                                            INRACT     74
C                                                                          INRACT     75
C                    MODIFY AN INPUT DATA SET FOR INTERFACE                INRACT     76
C                                                                          INRACT     77
       WRITE (2,1100)                                                      INRACT     78
       IF( .NOT. YES(0)) GO TO 2900                                        INRACT     79
C                                                                          INRACT     80
       CALL AORVW(10)                                                      INRACT     81
       GO TO 90000                                                         INRACT     82
C                                                                          INRACT     83
 2900  CONTINUE                                                            INRACT     84
C                                                                          INRACT     85
       CALL CFRVW(10)                                                      INRACT     86
       GO TO 90000                                                         INRACT     87
 3000  CONTINUE                                                            INRACT     88
C                                                                          INRACT     89
C                    CREATE AN INPUT DATA SET FOR CFIELD PLOT              INRACT     90
C                                                                          INRACT     91
       CREATE = .TRUE.                                                     INRACT     92
       PLOT = .TRUE.                                                       INRACT     93
       CALL INPLOT                                                         INRACT     94
       GO TO 90000                                                         INRACT     95
 4000  CONTINUE                                                            INRACT     96
C                                                                          INRACT     97
C                    MODIFY AN INPUT DATA SET FOR CFIELD PLOT              INRACT     98
C                                                                          INRACT     99
      CALL PLTRVW                                                          INRACT    100
C                                                                          INRACT    101
C                                                                          INRACT    102
90000  CONTINUE                                                            INRACT    103
C                                                                          INRACT    104
C                                                                          INRACT    105
       WRITE (2,90110)                                                     INRACT    106
90110  FORMAT (//)                                                         INRACT    107
       WRITE(2,90100)                                                      INRACT    108
90100  FORMAT(   40H ARE YOU DONE FOR THIS SESSION (Y OR N) )              INRACT    109
       WRITE (2,90110)                                                     INRACT    110
       IF( .NOT. YES(0)) GO TO 50                                          INRACT    111
       STOP                                                                INRACT    112
       END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
7527 INRACT 1

VARIABLES	SN	TYPE		RELOCATION							
1	CREATE	LOGICAL		CNTROL	REFS	4	7	DEFINED	26	55	90
0	DATIN	INTEGER		UNITS	REFS	5	9	DEFINED	16		
1	DATOUT	INTEGER		UNITS	REFS	5	9	DEFINED	17		
312	DTEMP	REAL	ARRAY	IBATH	REFS	8					
623	INTREC	LOGICAL		IBATH	REFS	4	8	DEFINED	27	56	
0	MORE	INTEGER		CNTROL	REFS	7					
0	NRCP	INTEGER		IBATH	REFS	8					
7754	NDEX	INTEGER			REFS	39	2*40	48	DEFINED	38	
624	PLOT	LOGICAL		IBATH	REFS	4	8	DEFINED	28	91	
2	QRANGE	REAL		CNTROL	REFS	7					
1	RTEMP	REAL	ARRAY	IBATH	REFS	8					

FILE NAMES		MODE							
0	INPUT								
1054	OUTPUT								
2130	TAPE1	FREE	READS	38					
4310	TAPE10								
3220	TAPE2	FMT	WRITES	29	57	76	104	106	108
5364	TAPE20								
6440	TAPE30								
0	TAPE5								
1054	TAPE6								

EXTERNALS	TYPE	ARGS	REFERENCES				
AORVW		1	79				
CFRVW		1	84				
CONNEC		1	18	19			
INCFLD		0	70				
INOVRD		0	63				
INPLOT		0	92				
PLTRVW		0	98				
RVWAIT		0	43				
TSTNDX		3	39				
YES	LOGICAL	1	4	59	77	109	

STATEMENT LABELS			DEF LINE	REFERENCES				
7536	50		22	109				
7646	100	FMT	30	29				
7553	500		44	40				
7564	1000		51	48				
7714	1100	FMT	58	57	76			
7574	1900		68	59				
7576	2000		72	48				
7605	2900		82	77				
7610	3000		86	48				
7614	4000		94	43				
7615	90000		101	64	74	80	85	93
7736	90100	FMT	107	106				
7731	90110	FMT	105	104	105			

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME (LENGTH)		
CNTROL	3	0 MORE (1)	1 CREATE (1)	2 QRANGE (1)
IBATH	405	0 NBCP (1)	1 RTEMP (201)	202 QTEMP (201)
		403 INTREC (1)	404 PLOT (1)	
UNITS	2	0 DATIN (1)	1 DATOUT (1)	

STATISTICS

PROGRAM LENGTH	241B	161
BUFFER LENGTH	7514B	3916
CM LABELED COMMON LENGTH	632B	410

60000B CM USED

END

DATE
FILMED

03-82

DTIC